HERB.

7. **Klebahnia Montanoae** (Arth. & Holway) Arthur.

Uromyces Montanoae Arth. & Holway; Arth. Mycologia **10**: 127. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, round or oblong, 0.1–1 mm. across, early naked, pulverulent, cinnamon- or light chestnut-brown, ruptured epidermis evident; urediniospores with pores in optical section appearing obovate-triangular or flattened-triangular, 23–26 μ wide, with pores in surface view obovoid or elliptic, 19–23 by 23–28 μ; wall cinnamon-brown, thin, 1–1.5 μ, moderately echinulate, the pores 2, equatorial.

III. Telia hypophyllous, scattered, round, 0.3–0.5 mm. in diameter, early naked, compact, dark cinnamon-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores narrowly obovoid or ovoid, 18–21 by 29–40 μ, rounded above, rounded or narrowed below; wall cinnamon-brown, thin, 1 μ, thickened at apex, 4–7 μ, smooth; pedicel colorless or yellowish, up to 50 μ long.

ON CARDUACEAE:
Montanoa dumicola Klatt, Costa Rica.
Montanoa hibiscifolia Benth., Guatemala.
Montanoa Pittieri Rob. & Greenm., Guatemala.
TYPE LOCALITY: San Lucas Toliman, Solola, Guatemala, on *Montanoa Pittieri*.
DISTRIBUTION: Central America.

8. **Klebahnia Bidentis** (P. Henn.) Arth. Mycologia **7**: 196. 1915.

Uredo Bidentis P. Henn. Hedwigia **35**: 251. 1896.
Puccinia Bidentis Dietel & Holway; Holway, Bot. Gaz. **24**: 32. 1897.
Uredo bidenticola P. Henn. Hedwigia **37**: 279. 1898.
Uredo amaniensis P. Henn. Bot. Jahrb. **38**: 106. 1905.
Uromyces bidenticola Arth. Mycologia **9**: 71. 1917.

O. Pycnia amphigenous, numerous, in small groups, honey-yellow becoming darker, globoid, 100–140 μ in diameter; ostiolar filaments few, 20–30 μ long; pycniospores large, 5–7 μ in diameter.

II. Uredinia amphigenous, circinating about the pycnia or scattered on indefinite, discolored spots, roundish, 0.2–0.8 mm. across, rather tardily naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 19–27 by 27–35 μ, sometimes slightly flattened with pores in optical section; wall cinnamon-brown, variable in thickness, 1.5–3 μ, moderately and distinctly echinulate, the pores 2, equatorial or slightly superequatorial.

III. Telia amphigenous, usually hypophyllous, frequently crowded or circinately confluent on pale, discolored spots, roundish, 0.2–1 mm. across, early naked, pulvinate, light cinnamon-brown becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores obovoid or oblong-clavate, 16–24 by 29–45 μ, rounded above and slightly narrowed below; wall pale cinnamon-brown or colorless, very thin, 1 μ, thickened into a colorless umbo at apex, 5–10 μ, smooth; pedicel colorless, once to twice length of spore, persistent.

ON CARDUACEAE:
Bidens expansa Greene, California.
Bidens heterophylla Ortega(*B. arguta* H.B.K.), Mexico (state?); Guatemala.
Bidens Holwayi Sherff & Blake, Guatemala.
Bidens leucantha L., Florida; Mexico (state), Morelos, Puebla; Guatemala; Bahamas; Cuba; Porto Rico; Jamaica; Martinique.
Bidens pilosa L., California; Costa Rica; Guatemala; Nicaragua; Bermuda; Cuba; Porto Rico; Martinique.
Bidens squarrosa H.B.K. (*B. tereticaulis* DC., *B. tereticaulis antiguensis* Coult.), Oaxaca; Costa Rica; Guatemala.
Bidens sp., Hidalgo.
Cosmos caudatus H.B.K., Porto Rico; Jamaica.
TYPE LOCALITY: Ecuador, on *Bidens andicola*.
DISTRIBUTION: Southern Florida and southern California, southward through the West Indies and Central America; also in South America, Africa, and Asia.
ILLUSTRATIONS: McAlpine, Rusts Austr. *pl. 28, f. 243, 244.*
EXSICCATI: Barth. Fungi Columb. *4493, 4691, 4887;* Barth. N. Am. Ured. *782, 783, 1686, 2484.*

35. *BULLARIA DC. Fl. Fr. 2: 226. 1805.

Argomyces Arth. N. Am. Flora **7** : 217. 1912.
Peristemma Sydow, Ann. Myc. **19** : 175. 1921.
Schroeterella Sydow, Ann. Myc. **20** : 119. 1922.

Cycle of development includes pycnia, primary uredinia (functioning as aecia), secondary uredinia, and telia, only occasionally showing distinct alternating phases; autoecious. Pycnia and other sori subepidermal.

Pycnia embedded in the tissues of the host, usually globoid or flask-shaped, with ostiolar filaments.

Uredinia erumpent, definite, without peridium, and without paraphyses except in a few species, generally of two sorts, primary and secondary; the primary uredinia usually accompanied by pycnia, generally in groups, sometimes on much hypertrophied areas, or forming distinct galls, the secondary uredinia unaccompanied by pycnia, usually without definite arrangement. Urediniospores borne singly on pedicels, globoid, ellipsoid, or obovoid; wall in most species colored, sometimes laminate, and in a few species much thicker above, echinulate (verrucose in *Bullaria Cordiae*), the pores one to several, variously arranged.

Telia erumpent, soon naked, or occasionally long covered by the epidermis. Teliospores free, pedicelled, two-celled, occasionally with a few one-celled (mesospores); wall generally colored, in a few species colorless, firm, smooth or verrucose, the pore of the upper cell apical or nearly so, of the lower cell variable.

Type species, *Bullaria Umbelliferarum* DC. (on *Umbelliferae*).

Host belonging to family Fabaceae.
- Urediniospore-wall thin (1–2 μ), with 2 pores. — 1. *B. Arachidis.*
- Urediniospore-wall thicker (1.5–2.5 μ), with 3 or 4 pores. — 2. *B. Zorniae.*

Host belonging to family Malpighiaceae.
- Urediniospore-wall very thick, 4–7 μ.
  - Teliospores 26–35 × 35–50 μ; pedicel swollen next to spore up to 26 μ wide. — 3. *B. circinata.*
  - Teliospores 37–41 × 50–58 μ; pedicel sometimes slightly swollen at base. — 4. *B. rubricans.*
- Urediniospore-wall thinner, 1.5–3 μ.
  - Urediniospores large, 25–32 × 39–45 μ; teliospores colorless. — 5. *B. barbatula.*
  - Urediniospores smaller, 18–27 × 24–39 μ; teliospores colored.
    - Urediniospore-pores 6–8, scattered. — 6. *B. Echinopteridis.*
    - Urediniospore-pores 3, usually equatorial. — 7. *B. inflata.*

Host belonging to family Euphorbiaceae.
- Teliospores 21–23 × 48–66 μ; wall 13–20 μ thick at apex. — 8. *B. longipes.*
- Teliospores 23–31 × 37–52 μ; wall 5–13 μ thick at apex. — 9. *B. velata.*

Host belonging to family Rhamnaceae.
- Urediniospore-pores 2 or 3. — 10. *B. Gouaniae.*
- Urediniospore-pore 1. — 11. *B. invaginata.*

Host belonging to family Myrtaceae. — 12. *B. Psidii.*

Host belonging to family Ammiaceae.
- Urediniospore-wall of uniform thickness. — 13. *B. Hydrocotyles.*
- Urediniospore-wall thickened above.
  - Teliospores smooth.
    - Teliospore-wall thin, 1–1.5 μ.
      - Teliospores oblong, 29–45 μ long. — 14. *B. Ziziae.*
      - Teliospores cylindric, 37–63 μ long. — 15. *B. Coelopleuri.*
    - Teliospore-wall thicker, more than 2 μ.
      - Teliospore-wall 2–3.5 μ thick. — 16. *B. bullata.*
      - Teliospore-wall 3–5 μ thick. — 17. *B. Prionosciadii.*
  - Teliospores rough.
    - Teliospores marked by a few, faint, longitudinal ridges. — 14. *B. Ziziae.*
    - Teliospores uniformly verrucose.
      - Teliospore-wall thick, 3–5 μ. — 17. *B. Prionosciadii.*
      - Teliospore-wall thinner, less than 3 μ.
        - Urediniospores 19–27 × 29–35 μ; wall 2.5–4 μ thick at apex. — 18. *B. Cynomarathi.*
        - Urediniospores 26–35 × 35–43 μ; wall 5–9 μ thick at apex. — 19. *B. Ellisii.*

Host belonging to family Apocynaceae. — 20. *B. Vincae.*

Host belonging to family Ehretiaceae. — 21. *B. Cordiae.*

Host belonging to family Verbenaceae. — 22. *B. elatipes.*

Host belonging to family Lamiaceae.
- Urediniospore-pores equatorial; teliospores colored. — 23. *B. impedita.*
- Urediniospore-pores near hilum; teliospores colorless. — 24. *B. parilis.*

Host belonging to family Solanaceae.
- Urediniospore-pores 3, equatorial; teliospore-wall thin, 1.5 μ. — 25. *B. adducta.*
- Urediniospore-pores 8 in two zones; teliospore-wall thick, 2.5–5 μ.

* *Bullaria* in collaboration with EDWIN BUTTERWORTH MAINS.

Teliospore-pedicel globoid. 26. *B. globosipes.*
Teliospore-pedicel fusiform-oblong. 27. *B. tumidipes.*
Host belonging to family Lobeliaceae. 28. *B. vacua.*
Host belonging to family Carduaceae.
Of the tribe Vernonieae.
Teliospores pale cinnamon-brown or colorless.
Teliospores usually less than 60 μ long. 29. *B. insulana.*
Teliospores usually more than 60 μ long. 30. *B. Arthuriana.*
Teliospores strongly colored.
Teliospores minutely verrucose.
Urediniospore-pores scattered, indistinct. 31. *B. fuscella.*
Urediniospore-pores approximately equatorial.
Urediniospore-pores usually 3; teliospores much thicker above. 32. *B. Vernoniae.*
Urediniospore-pores usually 2; teliospores slightly thicker above.
Teliospore-wall 2.5–3 μ thick. 33. *B. inaequata.*
Teliospore-wall 3–6 μ thick. 34. *B. semiinsculpta.*
Teliospores prominently verrucose.
Teliospores closely verrucose.
Teliospore-wall 3–6 μ thick; telia chiefly epiphyllous. 34. *B. semiinsculpta.*
Teliospore-wall 3–4 μ thick; telia chiefly hypophyllous. 35. *B. idonea.*
Teliospores sparsely verrucose.
Teliospore-wall moderately thick, 3–4 μ; telia epiphyllous. 36. *B. praealta.*
Teliospore-wall very thick, 4–6 μ. 37. *B. egregia.*
Of the tribe Eupatorieae.
Teliospores prominently verrucose.
Urediniospore-pores 2 (rarely 3), equatorial. 38. *B. Conoclinii.*
Urediniospore-pores 2 (rarely 3), basal.
Teliospore-wall 1–1.5 μ thick. 40. *B. basiporula.*
Teliospore-wall 3–4 μ thick. 41. *B. Hodgsoniana.*
Teliospores minutely verrucose.
Urediniospores 23–28 μ long. 39. *B. concinna.*
Urediniospores 26–34 μ long. 48. *B. subdecora.*
Teliospores smooth, or appearing so in water.
Teliospore-pedicel firm, persistent.
Walls of pedicel thin.
Urediniospores globoid. 47. *B. Kuhniae.*
Urediniospores reniform. 44. *B. inanipes.*
Walls of pedicel thick, nearly obliterating lumen.
Urediniospores globoid. 42. *B. solidipes.*
Urediniospores reniform. 43. *B. Espinosarum.*
Teliospore-pedicel fragile, largely deciduous.
Teliospore-wall thin (1.5–2 μ). 45. *B. inermis.*
Teliospore-wall thick (3–6 μ).
Teliospore-wall slightly thicker above.
Teliospore-wall smooth.
Teliospores with prominent papilla. 47. *B. Kuhniae.*
Teliospores with low papilla. 46. *B. redempta.*
Teliospore-wall minutely verrucose. 48. *B. subdecora.*
Teliospore-wall much thicker above.
Teliospores 26–30 μ broad. 39. *B. concinna.*
Teliospores 32–35 μ broad. 49. *B. decora.*
Of the tribe Astereae. 50. *B. Baccharidis-multiflorae.*
Of the tribe Heliantheae.
Teliospores finely verrucose.
Urediniospore-pores superequatorial.
Sori from a diffused mycelium. 51. *B. triannulata.*
Sori from a limited mycelium. 52. *B. Balsamorhizae.*
Urediniospore-pores equatorial. 53. *B. proba.*
Teliospores smooth. 54. *B. Enceliae.*
Of the tribe Helenieae. 55. *B. Gaillardiae.*
Of the tribe Anthemideae.
Teliospores verrucose throughout. 56. *B. Chrysanthemi.*
Teliospores minutely verrucose above. 57. *B. Absinthii.*
Of the tribe Cynareae.
Sori from a limited mycelium.
Teliospore-wall thin (1–3 μ).
Teliospore-wall 1–2 μ thick. 58. *B. Cirsii.*
Teliospore-wall 1.5–2.5 μ thick. 63. *B. Bardanae.*
Teliospore-wall 2–3 μ thick. 62. *B. Carthami.*
Teliospore-wall thick (3–3.5 μ). 61. *B. irrequista.*
Sori from a diffused mycelium.
Urediniospore-pores 2. 60. *B. Cyani.*
Urediniospore-pores 3. 59. *B. suaveolens.*
Host belonging to family Cichoriaceae.

Teliospore-wall 1 μ or less thick. 64. *B. chondrillina.*
Teliospore-wall usually more than 1 μ thick.
Urediniospore-wall less than 3 μ thick. 65. *B. Hieracii.*
Urediniospore-wall more than 3 μ thick. 66. *B. Pinaropappi.*

1. Bullaria (?) Arachidis (Speg.) Arthur & Mains.

Puccinia Arachidis Speg. Anal. Soc. Ci. Argent. **17**: 90. 1884.
Uredo Arachidis Lagerh. Tromsö Mus. Aarsh. **17**: 106. 1894.
Uromyces Arachidis P. Henn. Hedwigia **35**: 224. 1896.

O. Pycnia unknown.

II. Uredinia mostly hypophyllous, scattered or irregularly grouped, sometimes confluent, round or oblong, 0.2–0.8 mm. across, tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores broadly ellipsoid or obovoid, 16–22 by 23–29 μ; wall cinnamon-brown, thin, 1–2 μ, moderately echinulate, the pores 2, equatorial or slightly subequatorial.

III. Telia chiefly hypophyllous, small, 0.2–0.3 mm. in diameter, scattered, prominent, soon naked, chestnut-brown, ruptured epidermis conspicuous; teliospores oblong or obovate, 14–16 by 38–42 μ, rounded or obtuse above, somewhat narrowed below, slightly constricted at septum; wall moderately thick, chestnut-brown, smooth; pedicel colorless, slender, once to once and a half length of spore.

ON FABACEAE:
Arachis hypogaea L., Florida; Cuba; Porto Rico; Grenada; Guadaloupe; Montserrat.
TYPE LOCALITY: Caá-guazú, Paraguay, on *Arachis hypogaea.*
DISTRIBUTION: Southern Florida and the West Indies; also in South America.

2. Bullaria (?) Zorniae (Dietel) Arth. Bull. Torrey Club. **49** : 190. 1922.

Uredo Zorniae Dietel, Hedwigia **38**: 257. 1899. (Not *Puccinia Zorniae* McAlpine, 1906.)
Puccinia offuscata Arth. Bull. Torrey Club **47**: 469. 1920.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, round or oval, 0.3–1 mm. long, rather tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; paraphyses peripheral, scarcely rising above the spore-mass, slightly clavate, 5–9 by 29–48 μ, the wall 1 μ thick, colorless, smooth; urediniospores broadly ellipsoid or broadly obovoid, 18–23 by 23–29 μ; wall cinnamon-brown, 1.5–2.5 μ thick, finely and closely echinulate, the pores 3 or 4, equatorial.

III. Telia hypophyllous, few, scattered, round, 0.1–0.3 mm. in diameter, rather tardily naked, compact, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores clavate, 13–18 by 32–53 μ, rounded above, narrowed below, slightly constricted at septum, germinating upon maturity; wall light golden-brown, 1–2 μ thick, slightly thickened at apex, 1–5 μ, smooth: pedicel up to one half length of spore, colorless.

ON FABACEAE:
Zornia bracteata (Walt.) Gmel. (*Z. tetraphylla* Michx.), Florida.
Zornia diphylla (L.) Pers., Cuba; Porto Rico.
TYPE LOCALITY: Copacabana, Rio de Janeiro, Brazil, on *Zornia diphylla.*
DISTRIBUTION: Southwestern Florida and the West Indies; also in South America.

3. Bullaria (?) circinata (Schw.) Arthur & Mains.

Uredo circinata Schw.; Berk. & Curt. Jour. Acad. Phila. **2**: 282. 1853.
Puccinia circinata Arth. Am. Jour. Bot. **5**: 471. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or in groups 2–3 mm. in diameter, rounded or oval, 0.3–1 mm. across, rather tardily naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores (dry or in alcohol) broadly ellipsoid or globoid, 22–26 by 26–32 μ; wall golden- or dark cinnamon-brown, 2.5–3 μ thick, very sparsely and prominently echinulate, the echinulations 7–10 μ apart, 2.5–4 μ long, 1 μ wide, colorless, the pores 2–4, equatorial; urediniospores in water mount swelling, 27–32 by 32–40 μ; wall 5–7 μ thick, consisting of a cinnamon-brown inner layer, 3–4 μ thick and a colorless outer layer, 1.5–4 μ thick.

III. Telia amphigenous, scattered, round or oval, 0.3–1 mm. across, rather tardily naked,

somewhat pulverulent, brownish-black, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 26–35 by 35–50 μ, rounded at both ends, not or slightly constricted at septum; wall dark chocolate-brown, uniformly 3–5 μ thick, rather obscurely reticulate, the areolae about 2–3 μ across; pedicel colorless, up to 50 μ long, in water swelling next to the spore to form a spherical enlargement up to 26 μ in diameter, attached laterally.

ON MALPIGHIACEAE:
?*Stigmaphyllon* sp., Guatemala.
TYPE LOCALITY: Surinam, on unnamed host, probably *Stigmaphyllon*.
DISTRIBUTION: Eastern Guatemala; also in South America.

4. **Bullaria rubricans** (Holway) Arthur & Mains.

Puccinia rubricans Holway, Jour. Myc. **10**: 165. 1904.

O. Pycnia hypophyllous, crowded in circular groups 1–1.5 mm. across, noticeable, yellowish or whitish, globoid, 110–130 μ in diameter; ostiolar filaments up to 90 μ long.

II. Uredinia of the primary form circinating about the pycnia upon brilliant red spots, 0.2–0.7 mm. in diameter, otherwise similar to the secondary form; secondary uredinia mostly hypophyllous, scattered, causing smaller reddish discolorations, circular or oval, 0.2–0.8 mm. across, somewhat tardily naked, cinnamon-brown, ruptured epidermis noticeable; urediniospores of both forms broadly ellipsoid or globoid, 32–35 by 34–43 μ; wall pale golden-brown, very thick, 4–7 μ, sometimes showing a thin outer colorless layer, 1 μ or less, sparsely and prominently echinulate, the pores 4, equatorial, rather indistinct.

III. Telia hypophyllous, scattered, round, 0.3–0.8 mm. in diameter, early naked, compact, blackish, ruptured epidermis noticeable; teliospores broadly ellipsoid, 37–41 by 50–58 μ, rounded or obtuse above, rounded below, not constricted at septum; wall chestnut-brown, very thick, 4–7 μ, thicker and paler at apex, 8–10 μ, closely pitted, the pits 2–3 μ in diameter; pedicel colorless below, yellowish-brown next to spore, up to 70 μ long, roughened and slightly swollen at the base.

ON MALPIGHIACEAE:
Banisteria Portillana (S. Wats.) C. B. Robinson (*Heteropteris Portillana* S. Wats.), Jalisco.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Myrica* sp., error for *Banisteria* sp.
DISTRIBUTION: Southwestern Mexico; also in South America.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 24, f. 86a, b.*

5. **Bullaria barbatula** (Arth. & Johnston) Arthur & Mains.

Puccinia barbatula Arth. & Johnston, Mem. Torrey Club **17**: 144. 1918.

O. Pycnia amphigenous, in small groups upon brownish discolored areas 1–3 mm. across, noticeable, dark-brown, globoid, 70–128 μ in diameter; ostiolar filaments up to 40 μ long.

II. Uredinia hypophyllous, few, circinating about the pycnia, oval or oblong, 0.2–0.8 mm. long, originating deep within the tissues and remaining partly covered by them, opening by slit or large pore, somewhat pulverulent, dark cinnamon-brown; urediniospores broadly ellipsoid or obovoid, 25–32 by 39–45 μ; wall dark cinnamon-brown, 2–2.5 μ thick, strongly and very sparsely echinulate, the echinulations colorless, 2–2.5 μ long, the pores 2, equatorial.

III. Telia hypophyllous, crowded about the uredinia on more or less irregular, light-colored areas, oval or oblong, 0.3–1 mm. long, long covered by the overarching tissue, whitish or pale-brown, somewhat pulverulent; teliospores oblong or oblong-clavate, 18–26 by 35–48 μ, rounded above, rounded or slightly narrowed below, somewhat constricted at septum; wall colorless, uniform in thickness, 1.5–2.5 μ, smooth; pedicel colorless, about half length of spore, 13–15 μ wide.

ON MALPIGHIACEAE:
Banisteria laurifolia L., Cuba.
TYPE LOCALITY: Paso Estancia, Cuba, on *Banisteria laurifolia*.
DISTRIBUTION: Eastern Cuba.

6. **Bullaria Echinopteridis** (Holway) Arthur & Mains.

Puccinia Echinopteridis Holway, Jour. Myc. **10**: 164. 1904.

O. Pycnia amphigenous, gregarious on yellowish spots, 2–2.5 mm. in diameter, rather inconspicuous, light-yellow or light-brown, flattened-globoid, 71–103 by 90–118 μ; ostiolar filaments short, 16–32 μ.

I. Uredinia of the primary form crowded on yellowish spots 2–5 mm. across, otherwise similar to the secondary form; secondary uredinia hypophyllous, scattered, round or oblong, 0.3–1.5 mm. long, rather tardily naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores of both forms broadly obovoid or ellipsoid, 18–26 by 26–34 μ; wall cinnamon-brown, 1.5–2 μ, moderately echinulate, the pores 6–8, scattered.

III. Telia amphigenous, scattered, circular, 0.2–0.5 mm. in diameter, early naked, pulverulent, blackish, ruptured epidermis noticeable; teliospores ellipsoid, 26–33 by 35–43 μ, rounded at both ends, slightly or not constricted at septum; wall dark chestnut- or chocolate-brown, uniformly 2.5–3.5 μ thick, conspicuously reticulate, the areolae 2–3 μ across; pedicel colorless, 9 by 23–39 μ, swelling in water up to 24–42 μ across next to spore, attached usually at or near septum.

ON MALPIGHIACEAE:
Echinopterys eglandulosa (A. Juss.) Small (*E. Lappula* A. Juss.), Jalisco, Puebla.
TYPE LOCALITY: Guadalajara, Mexico, on *Echinopterys Lappula*.
DISTRIBUTION: Southern Mexico.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 25, f. 88a, b, c.*
EXSICCATI: Sydow, Ured. *1870.*

7. **Bullaria inflata** (Arth.) Arthur & Mains.

Puccinia inflata Arth. Bull. Torrey Club **33**: 516. 1906.

O. Pycnia mostly hypophyllous, crowded in circular groups 0.5–1.5 mm. in diameter, noticeable, whitish or brownish, globoid, 80–110 μ in diameter; ostiolar filaments up to 65 μ long.

II. Uredinia of the primary form mostly epiphyllous, crowded in circular groups 2–3 mm. in diameter about the pycnia, otherwise similar to the secondary form; secondary uredinia mostly hypophyllous, scattered, round or oblong, 0.1–1 mm. across, remaining partly covered by the ruptured epidermis, opening by a slit, pulverulent, dark cinnamon- or chestnut-brown, ruptured epidermis evident; urediniospores of both forms broadly ellipsoid or obovoid, 19–27 by 24–37 μ; wall dark cinnamon-brown, 1.5–2.5 μ thick, sparsely and prominently echinulate, the pores 3, usually approximately equatorial, sometimes somewhat scattered.

III. Telia amphigenous, scattered, or crowded in groups 3–6 mm. in diameter, round or oblong, 0.2–1 mm. across, remaining partly covered by the ruptured epidermis, opening by a slit, brownish-black, ruptured epidermis evident; teliospores ellipsoid, 23–32 by 29–42 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, 2.5–4 μ thick, conspicuously reticulate, the areolae 2–3 μ across; pedicel colorless, once or twice length of spore, in water swelling next to spore to form a globoid enlargement 16–26 μ in diameter, laterally attached, usually at septum.

ON MALPIGHIACEAE:
Stigmaphyllon lingulatum (Poir.) Small, Porto Rico; Mona Island.
Stigmaphyllon periplocifolium (Desf.) A. Juss., Cuba.
Stigmaphyllon Sagraeanum A. Juss. (*S. reticulatum* A. Juss.), Cuba.
TYPE LOCALITY: Baracoa, Cuba, on *Stigmaphyllon periplocifolium*.
DISTRIBUTION: West Indies.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 25, f. 87a, b.*
EXSICCATI: Barth. N. Am. Ured. *42, 1657.*

8. **Bullaria longipes** (Sydow) Arthur & Mains.

Puccinia Euphorbiae longipes Sydow, Ured. *1521.* 1901.

O. Pycnia amphigenous, gregarious, in groups 0.5–1 mm. in diameter on yellowish spots, rather inconspicuous, light-olivaceous becoming light-brown, globoid or flattened-globoid, 58–98 by 58–80 μ; ostiolar filaments agglutinated into a column, 48–55 μ long; pycniospores ellipsoid, 1.5–3 μ, colorless.

II. Uredinia mostly hypophyllous, generally crowded on yellowish or brownish spots 0.2–1 cm. in diameter, oval, 0.2–1 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 18–27 by 28–37 μ; wall consisting of two layers, the inner golden-brown, the outer colorless, 2–3 μ thick, moderately or sparsely echinulate, the pores 6–10, rather indistinct.

III. Telia amphigenous, crowded on discolored areas, oval or oblong, 0.2–1.5 mm. long, early naked, pulverulent, dark chocolate-brown, ruptured epidermis evident; teliospores ellipsoid or oblong-ellipsoid, 21–23 by 48–66 μ, rostriform at apex, rounded below, not constricted at septum; wall dark chestnut-brown, thick, 2.5–4 μ, lighter at apex, golden-brown, 13–20 μ thick, closely and finely verrucose; pedicel colorless below, golden-brown and enlarged next to spore, 10 by 42–65 μ, enlarged at base into a bulbose swelling, 12–16 μ in diameter.

ON EUPHORBIACEAE:
Aklema caracasana (Klotzsch & Garcke) Millsp. (*Euphorbia caracasana* Klotzsch & Garcke), Guatemala.
Aklema cotinifolia (L.) Millsp. (*Euphorbia cotinifolia* L.), Mexico (state), Oaxaca; Guatemala.
TYPE LOCALITY: Oaxaca, Mexico, on *Euphorbia cotinifolia*.
DISTRIBUTION: Southern Mexico and Central America.
EXSICCATI: Barth. Fungi Columb. *2559;* Sydow, Ured. *1521, 2465*.

9. **Bullaria velata** (Ellis & Ev.) Arthur & Mains.

Uredo velata Ellis & Ev. Bull. Torrey Club **22**: 435. 1895.
Puccinia Euphorbiae minor Holway, Bot. Gaz. **24**: 31. 1897.
Puccinia velata Arth. Am. Jour. Bot. **5**: 472. 1918.

O. Pycnia amphigenous, gregarious in groups 0.5–1 mm. in diameter, on yellowish spots, rather inconspicuous, light-brown, flattened-globoid, 58–96 by 39–64 μ; ostiolar filaments agglutinated into a column up to 60 μ long.

II. Uredinia hypophyllous, crowded on yellowish spots 0.4–1 cm. in diameter, or scattered, oval or oblong, 0.5–1.5 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 18–26 by 29–36 μ; wall of two layers, the inner golden-brown, the outer colorless, 1.5–3.5 μ thick, moderately or sparsely echinulate, the pores about 6–8, scattered, rather indistinct.

III. Telia hypophyllous, scattered or crowded on yellowish spots with the uredinia, oval, 0.2–1.5 mm. long, early naked, pulverulent, blackish, ruptured epidermis conspicuous; teliospores ellipsoid, 23–31 by 37–52 μ, acute above, rounded below, not or slightly constricted at septum; wall dark chestnut-brown, 3–5 μ thick, thickened at apex, 5–13 μ, closely verrucose; pedicel colorless in lower portion, golden-brown and enlarged next to spore, 6–7 by 29–48 μ, swollen at base up to 12 μ in diameter.

ON EUPHORBIACEAE:
Aklema ovata (Schlecht.) Millsp. (*Alectoroctonum ovatum* Schlecht., *Euphorbia Schlechtendahlii* Boiss.), Jalisco, Morelos.
Aklema petiolare (Sims) Millsp. (*Euphorbia petiolaris* Sims), Mona Island; St. Thomas.
Aklema Scotana (Schlecht.) Millsp. (*Euphorbia Scotana* Boiss.), Oaxaca, Veracruz; Guatemala.
TYPE LOCALITY: Island of Oahu, Sandwich Islands, on *Euphorbia cordata*.
DISTRIBUTION: Southern Mexico and the West Indies; also in Hawaii.
ILLUSTRATIONS: Holway, N. Am. Ured. **1**: *pl. 26, f. 91a, b*.
EXSICCATI: Sydow, Ured. *1871, 1872*.

10. **Bullaria Gouaniae** (Holway) Arthur & Mains.

Puccinia Gouaniae Holway, Ann. Myc. **3**: 21. 1905.

O. Pycnia amphigenous, on yellowish-brown, gall-like hypertrophies 0.5–5 mm. in diamter, light-yellow, punctiform, inconspicuous, globoid, 71–144 μ in diameter; ostiolar filaments 55–96 μ long.

II. Uredinia of the primary form amphigenous, crowded upon gall-like thickenings of the leaf 1–4 mm. across, surrounding the pycnia, oval or oblong, 0.2–0.7 mm. long, early naked, dark cinnamon-brown, somewhat pulverulent, ruptured epidermis evident; paraphyses none; urediniospores obovoid or triangular-obovoid, 21–27 by 26–32 μ; wall cinnamon-brown, 2.5–4 μ thick, sparsely and strongly echinulate, the pores 2, equatorial; secondary uredinia usually hypophyllous, scattered, the sori arising superficially from hyphal masses developing from beneath the epidermis, circular, 0.1–0.3 mm. in diameter, dark cinnamon-brown, pulverulent, ruptured epidermis inconspicuous; paraphyses numerous, peripheral, cylindric or somewhat clavate, incurving, 12–18 by 50–80 μ, usually 1-septate, the wall uniformly thin,

1 μ or less, colorless, smooth; urediniospores obovoid or triangular-obovoid, 21–26 by 24–30 μ; wall dark cinnamon-brown, 1–2.5 μ thick, moderately or closely echinulate, the pores usually 2, equatorial, sometimes 3, superequatorial.

III. Telia not seen; teliospores produced in the uredinia, broadly ellipsoid, 24–32 by 34–45 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, uniformly 3–5 μ thick, moderately and rather coarsely verrucose; pedicel colorless or somewhat tinted next to spore, about length of spore, fragile at base.

ON RHAMNACEAE:
Gouania lupuloides (L.) Urban (*G. domingensis* L.), Guatemala; Panama; Cuba; Porto Rico; Santo Domingo.
Gouania polygama (Jacq.) Urban (*G. tomentosa* Jacq.), Costa Rica; Cuba; Porto Rico.
TYPE LOCALITY: Gibara, Cuba, on *Gouania tomentosa*.
DISTRIBUTION: West Indies and Central America; also in South America.
EXSICCATI: Barth. N. Am. Ured. *544*.

11. **Bullaria invaginata** (Arth. & Johnston) Arthur & Mains.

Uredo Gouaniae Ellis & Kelsey, Bull. Torrey Club **24**: 209. 1897. Not *Bullaria Gouaniae* Arth. & Mains, 1922 (above).
Puccinia invaginata Arth. & Johnston, Mem. Torrey Club **17**: 146. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, round or oval, 0.2–0.5 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; paraphyses peripheral, cylindric or clavate, somewhat incurved, often branching at base, 9–16 by 29–45 μ, the wall colorless, thin, smooth; urediniospores with pore in optical section reniform or obovoid-reniform, 16–19 by 26–31 μ, with pore in surface view obovoid, 19–23 by 26–31 μ; wall light cinnamon-brown, 1.5–2 μ, sparsely or moderately echinulate, only one pore, equatorial on indented or flattened side.

III. Telia amphigenous, scattered, round or oval, 0.2–0.5 mm. across, early naked, pulverulent, dark chocolate- or blackish-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid or broadly obovoid, 24–26 by 29–37 μ, rounded at both ends, slightly or not constricted at septum; wall dark chestnut-brown, uniformly 3–4 μ thick, moderately verrucose; pedicel colorless, 20–50 μ long, fragile.

ON RHAMNACEAE:
Gouania lupuloides (L.) Urban (*G. domingensis* L.), Guatemala; Cuba; Porto Rico; St. Croix.
Gouania polygama (Jacq.) Urban (*G. tomentosa* Jacq.), Porto Rico.
TYPE LOCALITY: St. Croix, on *Gouania domingensis*.
DISTRIBUTION: West Indies and Guatemala; also in South America.

12. **Bullaria** (?) **Psidii** (Wint.) Arthur & Mains.

Puccinia Psidii Wint. Hedwigia **23**: 171. 1884.
Uredo flavidula Wint. Hedwigia **24**: 260. 1885.
Uredo Myrtacearum Paz. Hedwigia **29**: 159. 1890.
Uredo Eugeniarum P. Henn. Hedwigia **34**: 337. 1895.
Puccinia Jambosae P. Henn. Hedwigia **41**: 105. 1902.
Uredo Myrciae Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 590. 1913.
Puccinia jambulana Rangel; Averna-Saccá, Bol. Agr. São Paulo **21**: 37. 1920.

O. Pycnia unknown.

II. Uredinia usually hypophyllous, crowded in round, brown, discolored areas 1–12 mm. across, oval or oblong, 0.1–1 mm. long, somewhat tardily naked, pulverulent, pale brownish-yellow, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 15–19 by 20–27 μ; wall colorless or pale-yellow, 1.5–2.5 μ thick, closely or moderately echinulate, the pores obscure.

III. Telia not seen; teliospores in uredinia, ellipsoid or obovoid, 16–23 by 27–45 μ, rounded above, narrowed or rounded below, slightly constricted at septum, germinating at maturity; wall pale cinnamon-brown, uniformly 1–1.5 μ, smooth; pedicel deciduous.

ON MYRTACEAE:
Jambosa Jambos (L.) Millsp. (*J. vulgaris* DC., *Eugenia Jambos* L.), Cuba; Porto Rico.
Psidium Guajana L., Porto Rico.
TYPE LOCALITY: São Francisco, Prov. St. Catharina, Brazil, on *Psidium pomiferum*.
DISTRIBUTION: West Indies; also in South America.
ILLUSTRATIONS: Mém. Soc. Neuchât. **5**: 590, *f. 96;* Bol. Agr. São Paulo **21**: 39, *f. 1.*

13. Bullaria Hydrocotyles (Link) Arthur & Mains.

Caeoma Hydrocotyles Link, in Willd. Sp. Pl. 6²: 22. 1825.
Uredo Hydrocotyles Bertero; Mont. Ann. Sci. Nat. II. 3: 356. 1835.
Trichobasis Hydrocotyles Cooke, Jour. Bot. 2: 343. 1864.
Uredo bonariensis Speg. Anal. Soc. Ci. Argent. 9: 171. 1880.
Puccinia Hydrocotyles Cooke, Grevillea 9: 14. 1880.
Aecidiolum Hydrocotyles Speg. Anal. Soc. Ci. Argent. 12: 80. 1881.

O. Pycnia unknown.

II. Uredinia amphigenous, chiefly epiphyllous, numerous, scattered or confluent in small groups, round or oval, 0.2–0.7 mm. across, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly ellipsoid, 19–27 by 24–32 μ; wall cinnamon-brown, 1.5–2.5 μ thick, closely or moderately and sharply echinulate, the pores 2, equatorial or slightly superequatorial.

III. Telia amphigenous, rare, scattered, round, 0.3–0.8 mm. across, early naked, pulverulent, chestnut-brown, surrounding epidermis noticeable; teliospores broadly ellipsoid or oblong, 19–26 by 30–42 μ, rounded at both ends, slightly constricted at septum; wall cinnamon-brown, 2–3 μ thick, not or only slightly thickened at apex, smooth, the pore of the upper cell at or slightly below apex, of the lower cell half way between septum and hilum; pedicel colorless, fragile, short, sometimes inserted laterally.

ON AMMIACEAE:
Hydrocotyle australis Coult. & Rose, Cuba; Porto Rico.
Hydrocotyle bonariensis Lam., South Carolina; Mexico (state); Guatemala.
Hydrocotyle Canbyi Coult. & Rose, Maryland.
Hydrocotyle mexicana Cham. & Schlecht., Oaxaca; Costa Rica; Guatemala.
Hydrocotyle prolifera Kellogg, Arizona, California.
Hydrocotyle ranunculoides L.f., Nevada; Bermuda.
Hydrocotyle umbellata L., Alabama, Florida, Texas; Costa Rica; Porto Rico.
Hydrocotyle verticillata Thunb., Louisiana, Mississippi, Nevada; Bermuda.
Hydrocotyle sp., Morelos.

TYPE LOCALITY: Near Rio de Janeiro, Brazil, on *Hydrocotyle* sp.

DISTRIBUTION: Maryland, Texas, and central California southward through Central America and the West Indies; Bermuda; also in Hawaii, New Zealand, South America, and Europe.

ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 37, f. 122a, b;* Grove, Brit. Rust Fungi *f. 130.*

EXSICCATI: Barth. N. Am. Ured. *548, 1764;* Ellis, N. Am. Fungi *1482;* Seym. & Earle, Econ. Fungi Suppl. *B12.*

14. Bullaria Ziziae (Ellis & Ev.) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Puccinia Ziziae Ellis & Ev. Bull. Torrey Club 22: 60. 1895.

O. Pycnia unknown.

II. Uredinia unknown; urediniospores present in the telia, ellipsoid, 22–27 by 30–35 μ; wall light cinnamon-brown, 2–2.5 μ thick, thickened at apex and often at base, 4–7 μ, moderately echinulate, the pores 3, approximately equatorial.

III. Telia mostly epiphyllous, scattered, round or oval, 0.2–0.8 mm. across, early naked, becoming pulverulent, dark cinnamon- or chestnut-brown, ruptured epidermis evident; teliospores somewhat irregularly oblong, oblong-clavate, or ellipsoid, 16–22 by 29–45 μ, rounded above, rounded or somewhat narrowed below, slightly constricted at septum; wall cinnamon-brown, rather thin, 1–1.5 μ, sometimes somewhat thickened at apex into a low papilla up to 3 μ thick, smooth, or occasionally with a few irregular longitudinal ridges, the pore of the upper cell at apex, of the lower cell at or near septum; pedicel colorless, fragile, up to half length of spore.

ON AMMIACEAE:
Zizia cordata Koch, Washington.

TYPE LOCALITY: Pullman, Washington, on *Zizia cordata.*

DISTRIBUTION: Known only from the type locality.

15. Bullaria Coelopleuri (Arth.) Arthur & Mains.

Puccinia Coelopleuri Arth. Bull. Torrey Club 46: 116. 1919.

O. Pycnia amphigenous or petiolicolous, crowded in groups 1–2 mm. in diameter, noticeable, chestnut- or chocolate-brown, globoid, 96–112 μ in diameter; ostiolar filaments not projecting much above the ostiole, 48–64 μ long.

II. Uredinia amphigenous; primary uredinia sometimes petiolicolous, crowded, circinating about the pycnia in round or oblong groups 2–10 mm. long, oblong, 0.5–4 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; secondary uredinia scattered over the leaves unaccompanied by pycnia, oval, 0.2–0.5 mm. long, otherwise like the primary form; urediniospores of both forms broadly obovoid or ellipsoid, 22–26 by 27–35 μ; wall cinnamon-brown, 2–2.5 μ thick, much thicker above, 3–7 μ, moderately echinulate, the pores 3, equatorial, covered by the colorless swollen cuticle.

III. Telia mostly hypophyllous, scattered, oval, 0.2–0.5 mm. long, early naked, somewhat pulverulent, chocolate-brown, ruptured epidermis evident; teliospores cylindric, oblong, or oblong-clavate, 15–20 by 37–63 μ, rounded above and below, or slightly narrowed below, not or slightly constricted at septum; wall dark cinnamon-brown, thin, 1–2 μ, slightly thickened at apex, 3–4 μ, smooth, the pore in upper cell at apex, in lower cell rather variable, 1/3 to 5/6 down in the cell; pedicel colorless, fragile.

ON AMMIACEAE:
Coelopleurum Gmelini (DC.) Ledeb., Alaska.
TYPE LOCALITY: Mendenhall, Alaska, on *Coelopleurum Gmelini*.
DISTRIBUTION: Southeastern Alaska.

16. **Bullaria bullata** (Pers.) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Uredo bullata Pers. Ann. Bot. Usteri **15**: 37. 1795.
Uredo Angelicae Schum. Enum. Pl. Saell. **2**: 233. 1803.
Bullaria Umbelliferarum DC. Fl. Fr. **2**: 226. 1805.
Uredo Athamanthae DC. Fl. Fr. **2**: 228. 1805.
Puccinia Umbelliferarum DC. Fl. Fr. **6**: 58. 1815.
Stilbospora bullata Link, Ges. Nat. Freunde Berlin Mag. **7**: 30. 1815.
Caeoma Athamantharum Link; Willd. Sp. Pl. 6^2: 22. 1825.
Puccinia Bullaria Link, in Willd. Sp. Pl. 6^2: 78. 1825.
Puccinia Angelicae Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 52. 1870.
Puccinia Silai Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 53. 1870.
Puccinia bullata Schroet. Beitr. Biol. Pfl. **3**: 74. 1879. Not *P. bullata* Link 1815, nor *P. bullata* Schw. 1822.
Puccinia Archangelicae A. Blytt, For. Vid.-Selsk. Christ. 1896^6: 51. 1896.
Dicaeoma bullatum Kuntze, Rev. Gen. 3^3: 468. 1898.
Puccinia Cervariae Lindr. Medd. Stockh. Högsk. Bot. Inst. 4^9: 3. 1901.
Puccinia Athamanthae Lindr. Acta Soc. Faun. Fl. Fenn. 22^1: 101. 1902.
Bullaria Angelicae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia amphigenous, crowded in small groups 1–2 mm. across, noticeable, dark-brown, flattened-globoid, 96–128 by 71–80 μ; ostiolar filaments 80–90 μ long.

II. Uredinia of the primary form circinating about the pycnia in groups 3–6 mm. across, otherwise the same as the secondary form; secondary uredinia mostly hypophyllous, round or oval, 0.2–1 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores of both forms broadly obovoid or ellipsoid, 19–29 by 27–39 μ; wall pale cinnamon- or golden-brown, 1.5–4 μ thick, thickened at apex, 3–10 μ, moderately echinulate, the pores 3, rarely 4, equatorial, covered by the more or less swollen cuticle.

III. Telia mostly hypophyllous, scattered, round or oval, 0.2–0.6 mm. across, early naked, pulverulent, chocolate-brown, ruptured epidermis evident; teliospores ellipsoid or oblong, sometimes irregularly so, 19–27 by 30–50 μ, rounded above and below, slightly constricted at septum; wall dark cinnamon- or chestnut-brown, 2–3.5 μ thick, sometimes slightly thickened at apex up to 4 μ, smooth, the pore of the upper cell usually at apex, of the lower variable, usually in lower half of the cell; pedicel colorless, fragile.

ON AMMIACEAE:
Angelica atropurpurea L., New York.
Angelica genuflexa Nutt., Washington.
Angelica Lyallii S. Wats., Oregon.
Angelica villosa (Walt.) B. S. P., Pennsylvania.
Taenidia integerrima (L.) Drude (*Zizia integerrima* DC., *Pimpinella integerrima* A. Gray), Indiana, Michigan, New York, Wisconsin.
Zizia aurea (L.) Koch, Manitoba.
TYPE LOCALITY: Europe, on stems of some umbelliferous plant.
DISTRIBUTION: Northern border of the United States and northward; also in Europe and Asia.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 90, 91, 92;* Holway, N. Am. Ured. **1**: *pl. 41, f. 133a, b, 134a, b.*
EXSICCATI: Barth. Fungi Columb. *4955;* Barth. N. Am. Ured. *621, 814, 1429;* Ellis & Ev. Fungi Columb. *1771.*

17. Bullaria (?) Prionosciadii (Lindr.) Arthur & Mains.

Puccinia Prionosciadii Lindr. Medd. Stockh. Högsk. Bot. Inst. 4⁹: 5. 1901.
Puccinia Coulterophyti Dietel & Holway; Holway, Bot. Gaz. **31**: 335. 1901.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, oval or oblong, 0.1–0.3 mm. long, early naked, pulverulent, pale-yellow, ruptured epidermis evident; urediniospores broadly ellipsoid or obovoid, 18–32 by 24–42 μ; wall colorless, 1–1.5 μ, gradually thickening from about the equator of the spore up to 5–18 μ at apex, sparsely or moderately echinulate, the pores rather indistinct, 2 or 3, equatorial.

III. Telia hypophyllous, scattered, oval or oblong, 0.1–0.3 mm. long, early naked, compact or somewhat pulverulent, brownish-black, ruptured epidermis evident; teliospores broadly ellipsoid, 23–35 by 35–60 μ, rounded at both ends, somewhat constricted at septum; wall light chestnut-brown, 3–5 μ thick, thickened at apex, 5–12 μ, closely and inconspicuously verrucose-rugose, often appearing smooth when wet, the pore in the upper cell apical, in the lower at or near septum; pedicel colorless, fragile, in some collections persistent, 60–80 μ long.

ON AMMIACEAE:
Coulterophytum Holwayi Rose, Jalisco, Michoacan.
Coulterophytum laxum B. L. Robinson, Jalisco.
Prionosciadium dissectum Coult. & Rose, Jalisco.
Prionosciadium linearifolium Coult. & Rose, Jalisco.
Prionosciadium Nelsoni Coult. & Rose, Mexico (state), Morelos.
Prionosciadium serratum Coult. & Rose, Jalisco.
Prionosciadium Watsoni Coult. & Rose, Jalisco.
TYPE LOCALITY: [Jalisco], Mexico, on *Prionosciadium Watsoni*.
DISTRIBUTION: Southern Mexico.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 43, f. 139a, b, c, d.*
EXSICCATI: Barth. Fungi Columb. *3463, 3859;* Barth. N. Am. Ured. *55, 258, 466, 1567;* Sydow, Ured. *1827.*

18. Bullaria Cynomarathri (Holway) Arthur & Mains.

Puccinia Cynomarathri Holway, N. Am. Ured. 1: 94. 1913.

O. Pycnia epiphyllous, crowded in groups 1–3 mm. across, conspicuous, honey-yellow or brownish-black, globoid, 90–100 by 93–112 μ; ostiolar filaments 70–80 μ long.

II. Uredinia of the primary form crowded in a confluent circinating group around the pycnia, 2–5 mm. long, 0.6–0.8 mm. wide, otherwise similar to the secondary form; secondary uredinia amphigenous, scattered, oval, 0.8–1 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores of both forms broadly ellipsoid or obovoid, 19–27 by 29–35 μ; wall cinnamon-brown, rather thick, 2–2.5 μ, sometimes slightly thickened at apex and base, 3–4 μ, moderately echinulate, the pores usually 3, equatorial, prominent, covered by the swollen colorless cuticle.

III. Telia amphigenous, scattered, oval or linear, 0.5–2 mm. long, early naked, pulverulent, dark chocolate-brown, ruptured epidermis conspicuous; teliospores oblong or ellipsoid, 22–26 by 37–48 μ, rounded above and below, or somewhat narrowed below, slightly constricted at septum; wall light chestnut- or dark cinnamon-brown, 1.5–2.5 μ thick, sometimes slightly thickened at apex, closely and rather prominently verrucose, the pore of the upper cell at apex, of the lower at septum; pedicel colorless, fragile.

ON AMMIACEAE:
Cynomarathrum Nuttallii (A. Gray) Coult. & Rose (*Peucedanum graveolens* S. Wats.), Utah.
TYPE LOCALITY: Wasatch Mountains, Wasatch County, Utah, on *Cynomarathrum Nuttallii*.
DISTRIBUTION: Wasatch Mountains, Utah.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 44, f. 142a, b.*
EXSICCATI: Garrett, Fungi Utah. *9, 51.*

19. Bullaria (?) Ellisii (De-Toni) Arthur & Mains.

Puccinia Angelicae Ellis & Ev. Bull. Washb. Lab. Nat. Hist. 1: 3. 1884. Not *P. Angelicae* Fuckel, 1870.
Puccinia Ellisii De-Toni, in Sacc. Syll. Fung. 7: 651. 1888.
Puccinia Bakeriana Arth. Bull. Torrey Club 31: 3. 1904.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, round, 0.2–0.4 mm. in diameter, early naked,

pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores broadly ellipsoid, 26–35 by 35–43 μ; wall cinnamon-brown, 2–4 μ thick, thickened 5–9 μ at apex and hilum, moderately echinulate, the pores 3 or 4, equatorial.

III. Telia amphigenous, scattered, round or oval, 0.3–1 mm. across, early naked, slightly pulverulent, chocolate-brown, ruptured epidermis evident; teliospores ellipsoid or obovoid, 22–29 by 35–45 μ, rounded above and below, somewhat constricted at septum; wall chestnut-brown, rather uniformly 1.5–3 μ thick, moderately or closely and finely verrucose, the pore of the upper cell at apex, of the lower at septum; pedicel colorless, fragile.

ON AMMIACEAE:
Angelica Breweri A. Gray, California.
Angelica genuflexa Nutt., Idaho, Oregon, Washington.
Angelica tomentosa S. Wats., California.
TYPE LOCALITY: Falcon Valley, Washington, on *Angelica genuflexa*.
DISTRIBUTION: Mountains of Washington and Idaho to central California.
ILLUSTRATIONS: Holway, N. Am. Ured. **1**: *pl. 41, f. 135a, b.*
EXSICCATI: Ellis, N. Am. Fungi *1449*.

20. **Bullaria Vincae** (DC.) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Uredo Vincae DC. Fl. Fr. **6**: 70. 1815.
Caeoma Vincae Link, in Willd. Sp. Pl. **6**[2]: 14. 1825.
Erysibe pustulata Vincae Wallr. Fl. Crypt. Germ. **2**: 198. 1833.
Puccinia Vincae Berk. in Smith Engl. Fl. **5**[2]: 364. 1836.
Trichobasis Vincae Berk.; Cooke, Micr. Fungi 210. 1865.
Puccinia Berkeleyi Pass.; Rab. Fungi Eur. *1686*. 1873.

O. Pycnia hypophyllous, numerous, scattered over a large portion of the leaf, conspicuous, light-brown or chestnut-brown, hemispheric, 176–222 by 112–128 μ; ostiolar filaments 144–176 μ long.

II. Uredinia hypophyllous, numerous, scattered among the pycnia, oval or oblong, 0.5–1.5 mm. long, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid, 19–26 by 26–44 μ; wall cinnamon- or golden-brown, 2–2.5 μ thick, moderately and faintly echinulate, the pores 3 or 4, equatorial.

III. Telia amphigenous, mostly hypophyllous, scattered, oval or oblong, 0.6–1.2 mm. long, early naked, somewhat pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 19–26 by 32–47 μ, rounded or somewhat narrowed at both ends, not or slightly constricted at septum; wall dark cinnamon- or chestnut-brown, 1.5–2.5 μ thick, thickened into a lighter colored umbo at apex, 5–7 μ, closely and finely verrucose in more or less evident longitudinal lines; pedicel colorless, short, fragile.

ON APOCYNACEAE:
Vinca major L., Massachusetts, Michigan.
TYPE LOCALITY: France.
DISTRIBUTION: Rare in greenhouses of Massachusetts and Michigan; also in Europe.
ILLUSTRATION: Grove, Brit. Rust Fungi *f. 127*.
EXSICCATI: Barth. Fungi Columb. *3834*.

21. **Bullaria Cordiae** (P. Henn.) Arthur & Mains.

Uredo Cordiae P. Henn. Hedwigia **43**: 163. 1904.
Puccinia Cordiae Arth. Mycologia **8**: 17. 1916.

O. Pycnia amphigenous and caulicolous, grouped in areas 1–2 mm. in diameter or scattered over the more or less deformed terminal leaves of infected shoots, conspicuous, dark-brown, globoid, 80–144 μ in diameter; ostiolar filaments forming a prominent agglutinated column up to 144 μ long.

II. Uredinia of the primary form mostly hypophyllous, causing hypertrophy, associated with the pycnia, round, 0.2–0.4 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis evident; paraphyses few or none; urediniospores ellipsoid, 15–23 by 28–32 μ; wall light cinnamon-brown, 1.5–2 μ thick, usually thickened above, 4–7 μ, closely verrucose, the pores probably 3 or 4, equatorial, rather indistinct; secondary uredinia scattered; paraphyses peripheral, hyphoid, 10–18 by 45–75 μ, the wall colorless, smooth, thin, 1 μ; urediniospores 21–26 by 29–35 μ; wall 1.5–2 μ thick, thickened at apex, 5–12 μ, otherwise similar to the primary form.

III. Telia amphigenous, scattered, round, 0.2–0.4 mm. across, early naked, chestnut-brown, ruptured epidermis evident; paraphyses as in the secondary uredinia; teliospores ellipsoid, 19–26 by 37–55 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, uniform in thickness, 2.5–3 μ, very coarsely and sparsely conically verrucose, especially above; pedicel colorless, 6–9 by 30–40 μ, in water swelling near base up to 20 μ in diameter.

ON EHRETIACEAE:
Gerascanthus alliodorus R. & S. (*Cordia alliodora* Cham.), Guatemala; Porto Rico.
TYPE LOCALITY: Tarapoto, Peru, on *Cordia* sp.
DISTRIBUTION: Rare in Guatemala and Porto Rico; also in South America.

22. **Bullaria elatipes** (Arth. & Holway) Arthur & Mains.

Puccinia elatipes Arth. & Holway; Arth. Mycologia **10**: 133. 1918.

O. Pycnia epiphyllous, few, crowded on discolored spots 1–1.5 mm. in diameter, conspicuous, cinnamon- or chocolate-brown, flattened-conic, 190–238 by 74–144 μ.

II. Uredinia amphigenous, crowded on spots with the pycnia, round or oval, 0.2–0.4 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores with the pores in optical section appearing triangular, 26–29 by 26–29 μ, with the pores in surface view obovate, 23–25 μ wide, seen from above elliptic; wall cinnamon-brown, 1.5 μ thick, rather sparsely and strongly echinulate, the pores 2, approximately equatorial.

III. Telia mostly hypophyllous, scattered, circular, 0.1–0.5 mm. in diameter, early naked, somewhat pulverulent, pulvinate, chestnut-brown, ruptured epidermis inconspicuous; teliospores ellipsoid, 23–26 by 39–45 μ, rounded at both ends, constricted at septum; wall cinnamon-brown, thin, 1 μ, thickened by a colorless umbo at apex, 3–6 μ, smooth; pedicel colorless, 18–24 by 103–151 μ, cylindric or fusiform-cylindric, thin-walled.

ON VERBENACEAE:
Lippia myriocephala Schlecht. & Cham., Guatemala.
Lippia sp., Costa Rica.
TYPE LOCALITY: Road from Quezaltenango to Colomba, Guatemala, on *Lippia myriocephala*.
DISTRIBUTION: Central America.

23. **Bullaria impedita** (Mains & Holway) Arthur & Mains.

Puccinia impedita Mains & Holway; Arth. Mycologia **10**: 135. 1918.

O. Pycnia epiphyllous, crowded in small groups with the uredinia, noticeable, chestnut-brown, globoid or flask-shaped, 74–109 μ wide by 80–112 μ high; ostiolar filaments 60–80 μ long, not projecting much beyond the ostiole.

II. Uredinia of the primary form crowded about the pycnia in small groups 1–3 mm. in diameter, otherwise same as the secondary form; secondary uredinia usually hypophyllous, scattered, round, 0.1–0.5 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores of both forms oblate-spheroid, 18–23 by 16–19 μ, or globoid or obovoid, 16–23 by 17–23 μ; wall cinnamon-brown, 1–1.5 μ, moderately or closely echinulate, the pores 2 or 3, approximately equatorial or subequatorial.

III. Telia hypophyllous or caulicolous, scattered on the leaves, round, 0.2–0.4 mm. in diameter, on the stems in large patches 2–12 mm. long, early naked, pulvinate at first, becoming pulverulent, brownish-black, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 24–32 by 30–49 μ, rounded above and below, not constricted at septum; wall dark chestnut- or chocolate-brown, thick, 3–5 μ, in some collections not thicker than 3.5 μ, thickened over pores into a yellowish umbo, 5–9 μ, very finely and inconspicuously verrucose; pedicel long, up to 160 μ, usually thick-walled, 1.5–2.5 μ.

ON LAMIACEAE:
Salvia assurgens H.B.K., Michoacan.
Salvia coccinea Juss., Porto Rico.
Salvia hyptoides Mart. & Gal., Costa Rica.
Salvia occidentalis Sw., Costa Rica; Guatemala; Cuba; Jamaica; Porto Rico; St. Croix.
Salvia tiliaefolia Vahl, Jalisco, Morelos; Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Salvia hyptoides*.
DISTRIBUTION: Southern Mexico southward through Costa Rica, and in the West Indies; also in South America.

24. **Bullaria parilis** (Arth.) Arthur & Mains.

Argomyces parilis Arth. N. Am. Flora **7**: 217. 1912.
Puccinia parilis Arth. Am. Jour. Bot. **5**: 485. 1918.

O. Pycnia epiphyllous, few in small groups on discolored spots 1 or 2 mm. across, or scattered among the uredinia, inconspicuous, globoid, 130–160 μ in diameter.

II. Uredinia hypophyllous, scattered, round, 0.1–0.4 mm. across, early naked, very pulverulent, chestnut-brown, ruptured epidermis inconspicuous; urediniospores globoid, or less often broadly ellipsoid, 19–24 by 20–30 μ, usually 20–23 μ in diameter; wall dark cinnamon-brown, concolorous, moderately thick, 1.5–3 μ, strongly and evenly echinulate with points about 2 μ apart, the pores 2 or 3 near hilum, not very distinct.

III. Telia hypophyllous, scattered, abundant, round, small, 0.1–0.3 mm. across, early naked, pulvinate, white, ruptured epidermis inconspicuous; teliospores oblong or lanceoblong, 16–20 by 35–50 μ, narrowed or obtuse at both ends, slightly constricted at septum; wall smooth, nearly or quite colorless, uniformly thin, about 1 μ; pedicel colorless, terete, delicate, one half to once length of spore.

ON LAMIACEAE:
Hyptis pectinata (L.), Poir. (*Mesosphaerum pectinatum* Kuntze), Jalisco, Morelos, Oaxaca.
Hyptis stellulata Benth. (*Mesosphaerum stellulatum* Kuntze), Guatemala.
TYPE LOCALITY: Oaxaca, Mexico, on *Hyptis pectinata*.
DISTRIBUTION: Southern Mexico and Guatemala.
EXSICCATI: Barth. N. Am. Ured. *641*.

25. **Bullaria adducta** (Arth.) Arthur & Mains.

Puccinia adducta Arth. Bull. Torrey Club **45**: 148. 1918.

O. Pycnia epiphyllous, few, on yellow spots surrounded by a purplish zone in groups 1–3 mm. in diameter, noticeable, chestnut-brown, globoid, 80–105 μ in diameter; ostiolar filaments not seen.

II. Uredinia of the primary form opposite the pycnia on large yellowish spots 2–5 mm. across, otherwise similar to the secondary form; secondary uredinia hypophyllous, scattered, round, minute, up to 0.5 mm. in diameter, early naked, dull chestnut-brown, ruptured epidermis evident; urediniospores of both forms irregularly obovoid, 19–23 by 27–35 μ; wall cinnamon-brown or paler, 1–2 μ thick, moderately and strongly echinulate, the pores probably 3, equatorial, indistinct.

III. Telia hypophyllous, following the uredinia, usually round, dull chestnut-brown, ruptured epidermis evident; teliospores ellipsoid or oblong, 19–26 by 35–45 μ, rounded or slightly tapering at both ends, slightly or not constricted at septum; wall cinnamon-brown, about 1.5 μ thick, usually with a slight papilla-like thickening at apex, smooth; pedicel short, rather thick, often deciduous.

ON SOLANACEAE:
Solanum racemosum Jacq., Antigua.
TYPE LOCALITY: Antigua, West Indies, on *Solanum racemosum*.
DISTRIBUTION: Known only from the type locality.

26. **Bullaria globosipes** (Peck) H. S. Jackson, Proc. Ind. Acad. Sci. **1915**: 437. 1916.

Puccinia globosipes Peck, Bull. Torrey Club **12**: 34. 1885.
Uredo similis Ellis, Jour. Myc. **7**: 275. 1898.
Dicaeoma globosipes Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Uredo inquirenda Arth. Bull. Torrey Club **34**: 592. 1907.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or crowded in irregular indefinite groups, round or elliptic, 0.5–1.2 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or oblong-obovoid, 16–26 by 27–48 μ; wall cinnamon-brown, 1.5–2.5 μ thick, sometimes thickened at apex, 2–3 μ, closely echinulate above, inconspicuously echinulate or smooth below, the pores 8, in two transverse bands of 4 each, the upper band superequatorial or occasionally equatorial, the lower subequatorial.

III. Telia amphigenous, scattered, round or elliptic, 0.3–1.2 mm. across, early naked,

pulverulent, brownish-black, ruptured epidermis noticeable; teliospores broadly ellipsoid or globoid, 29–39 by 33–50 μ, rounded above and below, not or slightly constricted at septum; wall chocolate- or dark chestnut-brown, thick, 3–5 μ, sometimes slightly thickened at apex, 4–7 μ, moderately or sparsely verrucose, with colorless or semihyaline markings 1.5–2 μ broad by 2–2.5 μ high; pedicel colorless, short, globoid in water, 37–48 μ in diameter.

ON SOLANACEAE:
Lycium Andersonii A. Gray, California, Nevada, Utah.
Lycium californicum Nutt., California.
Lycium carolinianum Walt., Cuba.
Lycium cedrosense Greene, Lower California.
Lycium Fremontii A. Gray, Arizona.
Lycium gracilipes A. Gray, Arizona, California.
Lycium halimifolium Mill. (*L. vulgare* Dunal), Alabama, Indiana, Mississippi, Pennsylvania, Texas.
Lycium Torreyi A. Gray, Arizona, Utah.
TYPE LOCALITY: California, on *Lycium californicum*.
DISTRIBUTION: Southern Pennsylvania to central Indiana and central California, and southward to the Mexican border and Cuba.
ILLUSTRATIONS: Bull. Torrey Club **12**: *pl. 49, f. 9, 10.*
EXSICCATI: D. Griff. W. Am. Fungi *284, 285.*

27. **Bullaria tumidipes** (Peck) Arth. Mycologia **8**: 136. 1916.

Puccinia tumidipes Peck, Bull. Torrey Club **12**: 34. 1885.
Dicaeoma tumidipes Kuntze, Rev. Gen. **3**[3]: 471. 1898.

O. Pycnia epiphyllous, in small groups, honey-yellow, becoming brownish, globoid or conic, 70–80 μ in diameter; ostiolar filaments 30–40 μ long.

II. Uredinia of the primary form grouped about the pycnia, otherwise similar to the secondary form; secondary uredinia amphigenous, scattered, round or elliptic, 0.3–1 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores of both forms oblong, oblong-ellipsoid, or oblong-obovoid, 16–25 by 27–42 μ; wall cinnamon-brown, 1.5–2.5 μ thick, closely and rather prominently echinulate above, less conspicuously so or smooth below, the pores 8, in two transverse bands of 4 each, the upper superequatorial or sometimes equatorial, the lower subequatorial.

III. Telia amphigenous, scattered or somewhat crowded, round or ellipsoid, 0.8–1.5 mm. across, early naked, pulverulent, brownish-black, ruptured epidermis noticeable; teliospores ellipsoid or oblong-ellipsoid, 23–30 by 37–55 μ, rounded or slightly narrowed above and below, not or only slightly constricted at septum; wall dark chestnut- or chocolate-brown, thick, 2.5–4 μ, thickened at apex, 5–7 μ, closely and finely verrucose, often appearing smooth when wet; pedicel colorless, inflated, fusiform-oblong, 27–39 μ broad, 65–96 μ long.

ON SOLANACEAE:
Lycium halimifolium Mill. (*L. vulgare* Dunal), Iowa, Kansas, Nebraska.
Lycium pallidum Miers, Arizona, Colorado, New Mexico, Texas, Utah.
Lycium parviflorum A. Gray, Arizona.
Lycium Torreyi A. Gray, Arizona, New Mexico.
TYPE LOCALITY: Arizona, on *Lycium Andersoni*, error for *L. pallidum*.
DISTRIBUTION: Kansas to Texas, and westward to Utah and Arizona.
ILLUSTRATIONS: Bull. Torrey Club **12**: *pl. 49, f. 3–8.*
EXSICCATI: Barth. N. Am. Ured. *66, 67, 271, 272, 2172, 2371, 2566, 2567;* Ellis & Ev. Fungi Columb. *1765, 1857;* Garrett, Fungi Utah, *223.*

28. **Bullaria vacua** (Dietel & Holway) Arthur & Mains.

Puccinia vacua Dietel & Holway; Holway, Bot. Gaz. **24**: 30. 1897.

O. Pycnia amphigenous, fairly numerous on yellowish or purplish spots with the uredinia, small, punctiform, noticeable, honey-yellow becoming cinnamon-brown, flattened-conic, 130–160 μ wide by 65–76 μ high; ostiolar filaments short.

II. Uredinia of the primary form epiphyllous, circinating about the pycnia in groups 0.4–1 mm. in diameter, otherwise similar to the secondary form; secondary uredinia hypophyllous, scattered, round or ellipsoid, 0.1–0.4 mm. across, tardily naked, pulverulent, pale-yellow, ruptured epidermis conspicuous; urediniospores of both forms broadly ellipsoid or globoid, 20–26 by 22–29 μ; wall pale-yellow or colorless, 2–3 μ thick, moderately and prominently echinulate, the pores 3 or 4, equatorial, rather indistinct.

III. Telia mostly hypophyllous, scattered, usually along the leaf's edge, round, small, 0.1–0.4 mm. across, early naked, pulvinate, becoming somewhat pulverulent, chestnut-brown, ruptured epidermis inconspicuous; teliospores ellipsoid, 19–27 by 42–48 μ, rounded above, rounded or slightly narrowed below, slightly constricted at septum, germinating at maturity; wall cinnamon- or light chestnut-brown, 1–2 μ thick, thickening gradually toward apex, up to 5–7 μ, very faintly and minutely reticulate, often appearing smooth; pedicel hyaline, up to 80 μ long, fragile.

ON LOBELIACEAE:
Lobelia sp., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Lobelia* sp.
DISTRIBUTION: Known only from the type locality.

29. **Bullaria insulana** (Arth.) Arthur & Mains.

Argomyces insulanus Arth. Mycologia **7**: 179. 1915.
Puccinia insulana H. S. Jackson, Bot. Gaz. **65**: 296. 1918.

O. Pycnia epiphyllous, few in crowded groups, globoid-flask-shaped, 105–175 by 170–200μ.

II. Uredinia of the primary form surrounding the pycnia, somewhat confluent; urediniospores slightly larger than in secondary uredinia, otherwise similar to the secondary form; secondary uredinia hypophyllous, few, scattered, round or oblong, small, 0.3–0.5 mm. long, early naked, pulverulent, dull cinnamon-brown, ruptured epidermis evident; urediniospores of both forms ellipsoid or obovoid, 19–26 by 26–35 μ; wall cinnamon-brown, moderately echinulate, 1.5–2.5 μ thick, the pores usually 3, equatorial or slightly subequatorial, indistinct.

III. Telia hypophyllous, few, usually scattered, round or oblong, 0.3–0.8 mm. long, early naked, dull cinnamon-brown, germinating at maturity, ruptured epidermis evident; teliospores broadly ellipsoid or ellipsoid-fusiform, 19–30 by 42–60 μ, obtuse, or somewhat attenuate at both ends, slightly constricted at septum; wall pale cinnamon-brown, thin, 1–1.5 μ, with a low hyaline papilla over the pore disappearing at germination, smooth, the pore in lower cell near septum; pedicel colorless, once length of spore or less.

ON CARDUACEAE:
Vernonia albicaulis Pers., Porto Rico; St. Croix.
Vernonia arborescens (L.) Sw. (*V. divaricata* Sw.), Jamaica.
Vernonia longifolia Pers., Porto Rico; Antigua.
Vernonia sp., Guatemala.
TYPE LOCALITY: [Dos Bocas], river junction below Utuado, Porto Rico, on *Vernonia albicaulis*.
DISTRIBUTION: Guatemala and the West Indies.

30. **Bullaria Arthuriana** (H. S. Jackson) Arthur & Mains.

Argomyces Vernoniae Arth. N. Am. Flora **7**: 218. 1912. Not *Bullaria Vernoniae* Arth. 1917.
Puccinia Arthuriana H. S. Jackson, Bot. Gaz. **65**: 395. 1918.

O. Pycnia epiphyllous, gregarious, few in groups 0.5–1 mm. across, punctiform, dark reddish-brown, globoid, 80–115 μ in diameter; ostiolar filaments about 35 μ long.

II. Uredinia hypophyllous, solitary or often surrounded by the telia, not usually abundant, roundish, about 0.5 mm. across, bright cinnamon-brown, ruptured epidermis evident; urediniospores flattened-globoid or globoid, 24–29 μ broad by 23–26 μ long; wall pale-yellow, 1.5–2 μ thick, moderately and prominently echinulate, the pores indistinct, apparently 4, equatorial.

III. Telia hypophyllous, usually in irregular groups 1.5–2 mm. across, roundish, 0.2–0.3 mm. across, pulvinate, light chestnut-brown, or cinereous by germination, ruptured epidermis not conspicuous; teliospores narrowly ellipsoid or fusiform, 16–24 by 55–70 μ, narrowed above and below, usually considerably constricted at septum; wall cinnamon-brown, uniformly thin, about 1 μ, smooth; pedicel fragile, colorless, one half to once length of spore.

ON CARDUACEAE:
Vernonia albicaulis Pers., Porto Rico.
Vernonia arbuscula Less., Bahamas.
Vernonia bahamensis Griseb., Bahamas.
Vernonia borinquensis Urban, Porto Rico.
Vernonia canescens H.B.K., Costa Rica.
Vernonia sericea Rich., Porto Rico.
TYPE LOCALITY: Cayey, Porto Rico, on *Vernonia borinquensis*.
DISTRIBUTION: Costa Rica and the West Indies.

31. Bullaria fuscella (Arth. & Johnston) Arthur & Mains.

Puccinia fuscella Arth. & Johnston, Mem. Torrey Club **17**: 157. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, roundish, punctiform, minute, 0.1–0.2 mm. across, early naked, pulverulent, light cinnamon-brown, ruptured epidermis noticeable; urediniospores broadly ellipsoid or obovoid, 23–29 by 26–32 μ; wall light cinnamon-brown, moderately thick, 2–3 μ, echinulate, the pores indistinct, probably 4–6, scattered.

III. Telia hypophyllous, scattered or crowded in groups of two or three sori, irregularly roundish, small, 0.2–0.3 mm. across, rather early naked, dark chestnut-brown, ruptured epidermis inconspicuous; paraphyses peripheral, hyphoid, colorless, thin-walled, short and inconspicuous; teliospores oblong, 21–27 by 40–48 μ, slightly constricted at septum, rounded or obtuse at both ends; wall cinnamon-brown, 1.5–2 μ, thicker above, 5–9 μ, including a semi-hyaline umbo, minutely verrucose above appearing smooth; pedicel colorless, fragile, two thirds length of spore or less.

ON CARDUACEAE:
Vernonia menthaefolia (Poepp.) Less., Cuba.
TYPE LOCALITY: Baracoa, Cuba, on *Vernonia menthaefolia*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *772*.

32. Bullaria Vernoniae (Schw.) Arth. Mycologia **9**: 302. 1917.

Puccinia bullata Schw. Schr. Nat. Ges. Leipzig **1**: 74. 1822. Not *P. bullata* Link, 1815.
Puccinia Vernoniae Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Tanaceti Vernoniae Burrill, Bull. Ill. Lab. Nat. Hist. **2**: 186. 1885.
Puccinia Vernoniae longipes Dietel, Jour. Myc. **7**: 43. 1891.
Puccinia Vernoniae brevipes Dietel, Jour. Myc. **7**: 43. 1891.
Puccinia longipes Lagerh. Tromsö Mus. Aarsh. **17**: 64. 1895.
Dicaeoma longipes Kuntze, Rev. Gen. **3**[3]: 469. 1898.

O. Pycnia epiphyllous, few, scattered among the uredinia, small, punctiform, honey-yellow, becoming brown, globoid, 112 μ broad by 120–130 μ high; ostiolar filaments free.

II. Uredinia of the primary form chiefly epiphyllous, rather numerous, crowded in groups up to 4 mm. in length, often confluent, small, round, 0.3–0.5 mm. across, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; secondary uredinia amphigenous, gregarious like the primary form, on yellow spots, or more often scattered, small, 0.2–0.5 mm. across, ruptured epidermis often conspicuous; urediniospores of both forms obovoid or broadly ellipsoid, 20–26 by 22–30 μ; wall cinnamon-brown, 1.5–3 μ thick, moderately or sparsely and prominently echinulate, the pores 3, approximately equatorial.

III. Telia amphigenous and caulicolous, on the leaf-blades often gregarious or confluent in groups 0.5–1.5 mm. across, more often scattered, round, 0.2–0.5 mm. across, on the stems fusiform, 10–30 mm. long, early naked, becoming somewhat pulverulent, dark chocolate-brown, ruptured epidermis noticeable when epiphyllous, inconspicuous when hypophyllous; teliospores oblong or ellipsoid, often irregular, 20–28 by 30–45 μ, somewhat longer and narrower in caulicolous sori, 19–26 by 40–58 μ, obtuse or rounded above, rounded or narrowed below, slightly or not constricted at septum (more frequently so in caulicolous form); wall light chestnut-brown, minutely verrucose, often appearing smooth, moderately thick, 1.5–3 μ, thicker at apex, 5–10 μ, concolorous or often slightly lighter above; pedicel colorless, slender, once to twice length of spore, in the caulicolous form usually much longer.

ON CARDUACEAE:
Vernonia altissima Nutt. (*V. maxima* Small), Indiana, Michigan.
Vernonia Baldwinii Torr., Iowa, Illinois, Michigan, Mississippi, Missouri, Oklahoma.
Vernonia corymbosa Schw., North Dakota.
Vernonia crinita Raf., Arkansas, Michigan, Oklahoma.
Vernonia Ervendbergii A. Gray, San Luis Potosí.
Vernonia fasciculata Michx., Illinois, Iowa, Nebraska, South Dakota.
Vernonia guadalupensis A. Heller, Texas.
Vernonia interior Small, Kansas, Missouri, Nebraska, Oklahoma, Texas.
Vernonia marginata (Torr.) Raf., New Mexico, Texas.
Vernonia missurica Raf. (*V. Drummondii* Shuttlew.), Michigan, Missouri.
Vernonia noveboracensis (L.) Willd., Delaware, Pennsylvania.
Vernonia pulchella Small, Georgia.
Vernonia sp., Virginia.

TYPE LOCALITY: Salem, North Carolina, on *Vernonia* [*noveboracensis*].
DISTRIBUTION: Delaware to northern Iowa and Nebraska, and southward to Georgia and northeastern Mexico.
EXSICCATI: Barth. Fungi Columb. *2573, 2970, 3271, 3674, 4276;* Barth. N. Am. Ured. *69, 70, 578, 873, 874, 973, 1674, 1879, 2374;* Brenckle, Fungi Dak. *369;* Ellis & Ev. Fungi Columb. *263, 353, 1670, 1774;* Ellis & Ev. N. Am. Fungi *1847, 2988, 3050;* D. Griff. W. Am. Fungi *59, 59a;* Seym. & Earle, Econ. Fungi Suppl. *B20;* Sydow, Ured. *273, 1015.*

33. **Bullaria inaequata** (Jackson & Holway) Arthur & Mains.

Puccinia inaequata Jackson & Holway; H. S. Jackson, Bot. Gaz. **65**: 309. 1918.

O. Pycnia epiphyllous, few, gregarious in the center of lighter colored spots, noticeable, depressed-globoid, 100–120 μ high by 100–175 μ broad; ostiolar filaments short.

II. Uredinia of the primary form chiefly epiphyllous, crowded and somewhat confluent in concentric groups 2.2 mm. across, surrounding the pycnia, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; secondary uredinia amphigenous, numerous, scattered, roundish, small, 0.2–0.5 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores of both forms obovoid or broadly ellipsoid, 18–23 by 23–28 μ, pale cinnamon-brown, 1.5–3 μ thick, prominently and sparsely echinulate, the pores 2 or 3, approximately equatorial.

III. Telia amphigenous, scattered, round, small, 0.2–0.5 mm. across, early naked, at first pulvinate becoming somewhat pulverulent, blackish-brown, ruptured epidermis conspicuous; teliospores oblong or broadly ellipsoid, 22–26 by 30–38 μ, rounded at both ends, not or scarcely constricted at septum; wall dark cinnamon- or chestnut-brown, 2.5–3 μ thick, slightly thickened at apex, 4–5 μ, finely and evenly verrucose-rugose, the pore of lower cell below the middle; pedicel colorless, short, usually deciduous, often attached laterally.

ON CARDUACEAE:
Vernonia patens H.B.K., Guatemala.
TYPE LOCALITY: Escuintla, Guatemala, on *Vernonia patens.*
DISTRIBUTION: Southern Guatemala.

34. **Bullaria semiinsculpta** (Arth.) Arthur & Mains.

Puccinia semiinsculpta Arth. Bot. Gaz. **40**: 204. 1905.

O. Pycnia epiphyllous, few in small groups, punctiform, honey-yellow becoming brown immersed, globoid, 150–180 μ across.

II. Uredinia of the primary form epiphyllous, surrounding the pycnia on yellowish hypertrophied spots with purple border; secondary uredinia scattered, round, small, 0.2–0.3 mm. across, soon naked, pale cinnamon-brown, pulverulent, ruptured epidermis noticeable; urediniospores of both forms broadly ellipsoid, obovoid, or globoid, 18–26 by 22–30 μ; wall golden-yellow fading to nearly colorless, moderately thick, 1.5–3 μ, sparsely and evenly echinulate, the pores indistinct, 2 or 3, equatorial.

III. Telia amphigenous, or often only epiphyllous, scattered, round, small, 0.2–0.5 mm. across, often confluent, soon naked, compact or pulverulent, chocolate-brown, becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores ellipsoid or ellipsoid-obovoid, 22–38 by 38–50 μ, rounded above, rounded or somewhat narrowed below, slightly or not constricted at septum; wall golden-brown in the germinating form to chocolate-brown in the pulverulent form, 3–6 μ thick, slightly or not thicker at apex, 4–10 μ, much thinner at base in the germinating form, with irregular, crowded sculpturing, finely to coarsely reticulate-verrucose; pedicel colorless, rather slender, 5–9 μ thick, once to twice length of spore, minutely rugose, or nearly smooth.

ON CARDUACEAE:
Vernonia Alamani DC., Mexico (state), Michoacan, Oaxaca.
Vernonia dictyophlebia Gleason, Michoacan.
Vernonia Karvinskiana DC., Oaxaca.
Vernonia serratuloides H.B.K. (*V. umbellifera* Gleason), Jalisco.
Vernonia sp., Morelos.
TYPE LOCALITY: Amecameca, Mexico, on *Vernonia Alamani.*
DISTRIBUTION: Southern Mexico.
EXSICCATI: Barth. Fungi. Columb. *4573;* Barth. N. Am. Ured. *168, 1570.*

35. **Bullaria idonea** (Jackson & Holway) Arthur & Mains.

Puccinia idonea Jackson & Holway; H. S. Jackson, Bot. Gaz. **65**: 304. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or somewhat crowded, frequently confluent along the midribs and larger veins, roundish or somewhat elongate, 0.3–0.6 mm. across, early naked, pulverulent, lemon-yellow fading to white, ruptured epidermis conspicuous; urediniospores broadly ellipsoid or obovoid, 18–21 by 23–28 μ; wall colorless, thin, 1–1.5 μ, finely and moderately echinulate, the pores obscure, but apparently equatorial.

III. Telia amphigenous, chiefly hypophyllous, scattered or somewhat crowded and frequently confluent along the midribs and larger veins, roundish or somewhat elongate, 0.3–0.6 mm. across, early naked, pulvinate, becoming pulverulent, blackish-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 23–28 by 35–45 μ, rounded at both ends, not or scarcely constricted at septum; wall chestnut-brown, moderately thick, 3–4 μ, slightly thickened at apex and over pore of lower cell to 7 μ, prominently and evenly verrucose, with broad low projections rather closely set, sometimes arranged in lines; pedicel colorless, flexuous, 3–5 μ thick, transversely rugose at base and swelling slightly, twice length of spore.

ON CARDUACEAE:
Eremosis trifloscula (H.B.K.) Gleason (*Vernonia trifloscula* H.B.K.), Costa Rica; Guatemala.
TYPE LOCALITY: Escuintla, Guatemala, on *Vernonia trifloscula*.
DISTRIBUTION: Central America.

36. **Bullaria praealta** (Jackson & Holway) Arthur & Mains.

Puccinia praealta Jackson & Holway; H. S. Jackson, Bot. Gaz. **65**: 306. 1918.
Puccinia Tonduziana Speg. Bol. Acad. Nac. Ci. Cordoba **23**: 184. 1919.

O. Pycnia unknown.

II. Uredinia epiphyllous, densely gregarious and often confluent on irregular spots 0.5–2 mm. across, bullate, 0.2–0.4 mm. across, long covered by the overarching and conspicuous epidermis, deep-seated, arising from below the palisade layer, pulverulent, light-yellow fading to whitish; urediniospores ellipsoid or obovoid, 18–20 by 24–28 μ; wall pale-yellow or colorless, thin, 1–1.5 μ, finely and moderately echinulate, the pores obscure, apparently 2, equatorial.

III. Telia epiphyllous, densely gregarious and often confluent on irregular spots 0.5–1.5 mm. across, becoming scattered, bullate, 0.2–0.4 mm. across, long covered by the overarching and conspicuous epidermis, deep-seated, arising from below the palisade layer, compact, chestnut-brown; teliospores ellipsoid, 24–28 by 32–40 μ, rounded at both ends, slightly or not constricted at septum; wall light chestnut-brown, 3–4 μ thick, slightly thickened over the pore of either cell, 4–5 μ, rather prominently and sparsely verrucose with conic projections; pedicel colorless, once to twice length of spore.

ON CARDUACEAE:
Eremosis trifloscula (H.B.K.) Gleason (*Vernonia trifloscula* H.B.K.), Costa Rica; Guatemala.
TYPE LOCALITY: Mazatenango, Guatemala, on *Vernonia trifloscula*.
DISTRIBUTION: Central America.
ILLUSTRATION: Bol. Acad. Nac. Ci. Cordoba **23**: 185.

37. **Bullaria (?) egregia** (Arth.) Arthur & Mains.

Puccinia egregia Arth. Bot. Gaz. **40**: 204. 1905.

O. Pycnia unknown.

II. Uredinia not seen; urediniospores from telial sori globoid or obovoid, 23–26 by 24–28 μ; wall golden-yellow, rather thick, 1.5–2.5 μ, moderately echinulate, the pores obscure, apparently 3, equatorial.

III. Telia amphigenous, scattered, round, 0.2–0.5 mm. across, early naked, pulvinate, becoming somewhat pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 26–30 by 35–45 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, very thick, 4–6 μ, very slightly thickened at apex and over pore of

lower cell, the latter placed near the pedicel, uniformly coarsely and prominently verrucose with conic and well-separated papillae; pedicel slender, 4–6 μ thick, the wall thin, smooth, colorless, once to twice length of spore or occasionally longer.

ON CARDUACEAE:

Eremosis salicifolia (DC.) Gleason (*Vernonia uniflora* Schultz-Bip., *V. salicifolia* Schultz-Bip.), Oaxaca.

TYPE LOCALITY: Oaxaca, Mexico, on *Vernonia uniflora*.

DISTRIBUTION: Known only from the type locality.

38. **Bullaria (?) Conoclinii** (Seym.) Arthur & Mains.

Puccinia Conoclinii Seym.; Burrill, Bot. Gaz. 9: 191. 1884.
Dicaeoma Conoclinii Kuntze, Rev. Gen. 3^3: 468. 1898.
Puccinia rosea Arth. Bot. Gaz. 40: 206. 1905. (Exclusive of aecia.)
Dicaeoma roseum Arth. Résult. Sci. Congr. Bot. Vienne 344. 1906.
Uredo Agerati Mayor, Mém. Soc. Neuch. Sci. Nat. 5: 595. 1913.

O. Pycnia unknown.

II. Uredinia chiefly hypophyllous, scattered or somewhat gregarious, round, small, 0.2–0.5 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis scarcely noticeable; urediniospores broadly ellipsoid, obovoid or globoid, 16–24 by 18–32 μ; wall pale cinnamon-brown, 1–1.5 μ thick, moderately echinulate, the pores 2, rarely 3, equatorial.

III. Telia chiefly hypophyllous, scattered, round, 0.5–0.8 mm. across, early naked, loose and sometimes pulverulent, dark chocolate-brown, ruptured epidermis scarcely noticeable; teliospores ellipsoid, 22–32 by 34–45 μ, rounded at both ends, slightly or not constricted at septum; wall dark chestnut-brown, concolorous or with slightly lighter umbo, 2.5–4 μ thick, thicker at apex and over pore of lower cell and at septum up to 8 μ, moderately and evenly verrucose; pedicel colorless, except near the spore, delicate, 6–8 μ thick, two to two and a half times length of spore, sometimes laterally attached.

ON CARDUACEAE:

Ageratum conyzoides L., Guatemala; Porto Rico.
Ageratum corymbosum Zucc., Morelos.
Ageratum corymbosum latifolium (DC.) B. L. Robinson, Guatemala.
Ageratum maritimum H.B.K., Cuba.
Ageratum rugosum Coult., Guatemala.
Ageratum strictum Hemsl., Morelos.
Conoclinium betonicum DC. (*Eupatorium betonicum* Hemsl.), Coahuila.
Conoclinium coelestinum (L.) DC. (*Eupatorium coelestinum* L.), Alabama, District of Columbia, Illinois, Indiana, Kentucky, Mississippi, Missouri, Oklahoma, South Carolina, Tennessee, Texas, West Virginia.
Conoclinium dichotomum Chapm., Florida.
Conoclinium Greggii (A. Gray) Small (*Eupatorium Greggii* A. Gray), Coahuila.
Eupatorium collinum DC., Guatemala.
Eupatorium deltoideum Jacq., Mexico (state), Oaxaca.
Eupatorium geranifolium Urban, Porto Rico.
Eupatorium glandulosum H.B.K., Guatemala.
Eupatorium Gonzalezii B. L. Robinson, Oaxaca.
Eupatorium Holwayanum B. L. Robinson, Oaxaca.
Eupatorium hymenolepis B. L. Robinson, Michoacan.
Eupatorium incarnatum Walt., Indiana, Louisiana.
Eupatorium Mendezii DC., Oaxaca.
Eupatorium Neaeanum DC., Oaxaca; Guatemala.
Eupatorium polyodon Urban, Porto Rico.
Eupatorium porphyranthemum A. Gray, Coahuila.
Eupatorium pycnocephaloides B. L. Robinson, Guatemala.
Eupatorium pycnocephaloides glandulipes B. L. Robinson, Guatemala.
Eupatorium pycnocephalum Less., Costa Rica; Guatemala.
Eupatorium Schaffneri Schultz-Bip., Hidalgo.
Eupatorium Sinclairi Benth., Costa Rica.
Eupatorium solidaginifolium A. Gray, Arizona.
Eupatorium villosum Sw., Cuba.

TYPE LOCALITY: Pine Hills, Union County, Illinois, on *Conoclinium coelestinum*.

DISTRIBUTION: District of Columbia to central Indiana and southern Arizona, southward through Central America and the West Indies; also in South America and Hawaii.

EXSICCATI: Barth. Fungi Columb. *4864;* Barth. N. Am. Ured. *57, 232, 1367, 1537, 1538, 2237, 2346, 2543;* Ellis N. Am. Fungi *1467;* Ellis & Ev. Fungi Columb. *482;* Kellerm. Fungi Sel. Guat. *7;* Seym. & Earle, Econ. Fungi Suppl. *B9a, b.*

39. **Bullaria (?) concinna** (Arth.) Arthur & Mains.

Puccinia concinna Arth. Bot. Gaz. **40**: 205. 1905.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, roundish, 0.25–0.5 mm. across, soon naked, light cinnamon-brown, pulverulent, ruptured epidermis conspicuous; urediniospores globoid or obovoid, 19–23 by 23–28 μ; wall cinnamon-brown, thin, 1–1.5 μ, moderately and minutely echinulate, the pores 2, occasionally 3, approximately equatorial.

III. Telia chiefly hypophyllous, scattered, roundish, 0.3–0.6 mm. across, soon naked, blackish, pulvinate, ruptured epidermis conspicuous; teliospores oblong or ellipsoid, 26–30 by 40–48 μ, rounded or obtuse above, rounded below, slightly or not constricted at septum; wall chocolate-brown, obscurely granulose-verrucose, appearing smooth, thick, 3–5 μ, thicker above, 6–10 μ, concolorous; pedicel colorless, except next to spore, delicate, once to thrice length of spore, usually deciduous and appearing short.

ON CARDUACEAE:
Conoclinium Greggii (A. Gray) Small (*Eupatorium Greggii* A. Gray), Chihuahua.
TYPE LOCALITY: Sierre Madre, Mexico, on *Eupatorium Greggii*.
DISTRIBUTION: Known only from the type locality.

40. **Bullaria (?) basiporula** (Jackson & Holway) Arthur & Mains.

Puccinia basiporula Jackson & Holway; Arth. Am. Jour. Bot. **5**: 528. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, few, scattered, round, small, 0.2–0.3 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid, sometimes flattened at hilum, 21–24 μ in diameter; wall cinnamon-brown, thin, 1–1.5 μ, closely and finely echinulate, the pores 2, near the hilum.

III. Telia chiefly hypophyllous, scattered, round, small, 0.3–0.5 mm. across, early naked, somewhat pulverulent, blackish-brown, ruptured epidermis inconspicuous; teliospores ellipsoid, 23–26 by 32–35 μ, rounded at both ends, slightly constricted at septum; wall chestnut-brown, 1.5–2.5 μ, thickened at apex and over pore of lower cell to 5 μ, closely and distinctly verrucose; pedicel colorless, persistent, 7 μ in diameter, the wall thin, once and a half to twice length of spore, often attached obliquely.

ON CARDUACEAE:
Eupatorium Mairetianum DC., Guatemala.
Eupatorium Mairetianum adenopodum B. L. Robinson, Guatemala.
Eupatorium rafaelense Coulter, Guatemala.
TYPE LOCALITY: Cerro Quemado, Quezaltenango, Guatemala, on *Eupatorium Mairetianum adenopodum*.
DISTRIBUTION: Western Guatemala.
EXSICCATI: Kellerm. Fungi Sel. Guat. *14*.

41. **Bullaria (?) Hodgsoniana** (Kern) Arthur & Mains.

Puccinia Hodgsoniana Kern; Arth. Am. Jour. Bot. **5**: 526. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, or occasionally gregarious and confluent, small, round, 0.25–0.5 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 19–26 by 24–30 μ; wall chestnut-brown, 1.5–2.5 μ thick, moderately and finely echinulate, the pores 2, near the hilum, rarely 3, all at hilum, or one of the three near the apex.

III. Telia chiefly hypophyllous, scattered, small, round, 0.5–0.8 mm. across, early naked, pulverulent, blackish-brown, ruptured epidermis inconspicuous; teliospores oblong or ellipsoid, 24–29 by 40–45 μ, rounded or obtuse above, rounded below, scarcely constricted at septum; wall chestnut-brown, 3–4 μ thick, lighter colored and thicker at apex, 5–9 μ, equally thickened over pore of lower cell, closely and prominently verrucose; pedicel colorless, once to twice length of spore, occasionally attached obliquely.

ON CARDUACEAE:
Eupatorium phoenicolepis guatemalensis B. L. Robinson, Guatemala.
Eupatorium Schultzii erythranthodium B. L. Robinson, Guatemala.

Eupatorium Schultzii ophryolepis B. L. Robinson, Guatemala.
Eupatorium Schultzii velutipes B. L. Robinson, Guatemala.
TYPE LOCALITY: Volcan Acatenango, Sacatepequez, Guatemala, on *Eupatorium phoenicolepis guatemalensis*.
DISTRIBUTION: Central Guatemala.

42. Bullaria (?) solidipes (Jackson & Holway) Arthur & Mains.

Puccinia solidipes Jackson & Holway; Arth. Am. Jour. Bot. 5: 527. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, or somewhat gregarious, round, small, 0.1–0.3 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis barely noticeable; urediniospores globoid or obovoid, somewhat irregular, 23–29 by 26–32 μ; wall dark cinnamon-brown, thin, 1–1.5 μ, closely and finely echinulate, the pores 2, sometimes 3, approximately equatorial.

III. Telia amphigenous, numerous, scattered on under surface of leaves, often crowded and more or less confluent on upper surface, early naked, somewhat pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores broadly ellipsoid, 30–35 by 38–45 μ, rounded at both ends, slightly constricted at septum; wall chestnut-brown, smooth, rather thick, 2.5–4 μ, slightly thicker above by a lighter umbo over the pore, 5–6 μ; pedicel colorless, persistent, the wall thickened, often nearly obliterating the lumen, the surface granulose at base, 6–7 μ in diameter, twice to thrice length of spore.

ON CARDUACEAE:
Eupatorium tubiflorum Benth., Michoacan; Guatemala.
TYPE LOCALITY: Volcan de Agua, Sacatepequez, Guatemala, on *Eupatorium tubiflorum*.
DISTRIBUTION: Southwestern Mexico to central Guatemala.

43. Bullaria (?) Espinosarum (Dietel & Holway) Arthur & Mains.

Puccinia Espinosarum Dietel & Holway; Holway, Bot. Gaz. 31: 332. 1901.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, small, 0.25–0.4 mm., early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores reniform, 19–23 μ high, 29–34 μ long, 19–26 μ broad; wall cinnamon-brown, rather thin, 1.5–2 μ, sparsely and prominently echinulate, the pores 2, opposite in either end, approximately equatorial.

III. Telia amphigenous, scattered, small, 0.25–0.3 mm. across, sometimes confluent, early naked, somewhat pulverulent, blackish, ruptured epidermis noticeable; teliospores semi-opaque, broadly elliptic, 30–33 by 35–45 μ, rounded at both ends and strongly depressed when dry, slightly or not constricted at septum; wall dark chocolate-brown, uniform, smooth, rather thick, 3–4 μ, slightly thicker at apex and over pore of lower cell, 4–6 μ; pedicel colorless, firm, stout, 7–9 μ, solid at apex, swelling below to 16 μ, the wall very thick, 5–7 μ, almost obliterating the lumen, twice to twice and a half length of spore, often attached somewhat to one side.

ON CARDUACEAE:
Eupatorium Espinosarum A. Gray, Oaxaca.
Eupatorium Smithii B. L. Robinson, Oaxaca.
Eupatorium sordidum Less., Oaxaca.
Eupatorium spiraeaefolium Schultz-Bip., Veracruz.
TYPE LOCALITY: Oaxaca, Mexico, on *Eupatorium Espinosarum*.
DISTRIBUTION: Southern Mexico.
EXSICCATI: Barth. N. Am. Ured. *236, 1241.*

44. Bullaria (?) inanipes (Dietel & Holway) Arthur & Mains.

Puccinia inanipes Dietel & Holway; Holway, Bot. Gaz. 31: 332. 1901.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, very small, punctiform, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores reniform, 23–27 μ from pore to pore, 19–24 μ broad at right angles, 18–21 μ high; wall cinnamon-brown, about 1 μ thick below, gradually becoming thicker above, 2 μ, moderately and prominently echinulate, the pores 2, one at each end, approximately equatorial.

III. Telia amphigenous, scattered, very small, punctiform, often confluent, early naked, somewhat pulverulent, blackish, ruptured epidermis inconspicuous; teliospores semi-opaque, broadly ellipsoid, 28–32 by 32–40 μ, rounded at both ends, strongly depressed when dry, slightly or not constricted at septum; wall dark chocolate-brown, smooth, moderately thick, 2.5–3 μ, slightly thicker at apex and over pore of lower cell, 4–6 μ; pedicel colorless, firm, stout, 7–9 μ at apex, swelling below, 10–12 μ, granulose when dry, the wall thin, 1–1.5 μ, once to thrice length of spore.

ON CARDUACEAE:
Eupatorium brevipes DC., Oaxaca.
Eupatorium hirsutum DC., Morelos.
Eupatorium sp., Jalisco.
TYPE LOCALITY: Oaxaca, Mexico, on *Eupatorium brevipes*.
DISTRIBUTION: Southern Mexico.
EXSICCATI: Barth. N. Am. Ured. *150*.

45. **Bullaria** (?) **inermis** (Jackson & Holway) Arthur & Mains.

Puccinia inermis Jackson & Holway; Arth. Mycologia **10**: 142. 1918.

O. Pycnia unknown.

II. Uredinia hypophyllous, few, scattered, round, small, 0.2–0.4 mm. in diameter, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores greatly compressed laterally, somewhat flattened beneath, appearing somewhat reniform when seen from the side with pores in optical section, 30–34 μ in breadth from pore to pore, 24–26 μ broad at right angles, 23–26 μ from hilum to apex; wall cinnamon-brown, 1–1.5 μ thick, finely and moderately echinulate, the pores 2, equatorial, one at each end.

III. Teliospores in the uredinia, broadly ellipsoid, 24–26 by 31–37 μ, rounded at either end, distinctly constricted at septum; wall chestnut-brown, uniformly 1.5–2 μ thick or thickened to 3 μ at pores, smooth, the pore of upper cell often placed laterally, pore of lower cell usually about half way between septum and pedicel; pedicel colorless, deciduous, or equaling the spore in length.

ON CARDUACEAE:
Eupatorium sp., Costa Rica.
TYPE LOCALITY: El Alto, near Cartago, Costa Rica, on *Eupatorium* sp.
DISTRIBUTION: Known only from the type locality.

46. **Bullaria** (?) **redempta** (H. S. Jackson) Arthur & Mains.

Puccinia redempta H. S. Jackson, Mycologia **14**: 107. 1922.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered or sometimes crowded and more or less confluent, roundish or elliptic, 0.5–1 mm. across, tardily naked, pulverulent, chestnut-brown, ruptured epidermis cinereous, conspicuous; urediniospores globoid or ellipsoid, somewhat irregular, 23–27 by 26–32 μ; wall dark cinnamon-brown, 1.5–2 μ thick, moderately echinulate, the pores 2, approximately equatorial.

III. Telia hypophyllous, scattered, roundish, 0.5–0.8 mm. across, tardily naked, pulverulent, chocolate-brown, ruptured epidermis cinereous, conspicuous; teliospores ellipsoid, somewhat irregular, 30–35 by 43–58 μ, rounded at both ends, slightly constricted at septum; wall chestnut-brown, 3–4 μ thick, slightly thickened at apex, 5–7 μ, concolorous or slightly lighter in color at apex, smooth; pedicel colorless, flexuous, short, deciduous, or equaling the spore, often attached obliquely.

ON CARDUACEAE:
Eupatorium atriplicifolium Lam., Tortola.
TYPE LOCALITY: Tortola, West Indies, on *Eupatorium atriplicifolium*.
DISTRIBUTION: Known only from the type locality.

47. **Bullaria Kuhniae** (Schw.) Kern, Trans. Am. Micr. Soc. **32**: 65. 1913.

Puccinia Kuhniae Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Brickelliae Peck, Bull. Torrey Club **12**: 34. 1885.
Dicaeoma Brickelliae Kuntze, Rev. Gen. **3**[3]: 468. 1898.

Dicaeoma Kuhniae Kuntze, Rev. Gen. 3^3: 469. 1898.
Puccinia Barroetiae Sydow, Monog. Ured. 1: 28. 1902.

O. Pycnia amphigenous, in small groups, honey-yellow, immersed, punctiform, globose, 80–110 μ in diameter; ostiolar filaments 50–65 μ long.

II. Uredinia amphigenous, chiefly hypophyllous, scattered or at first gregarious, small, 0.2–0.8 mm. across, round, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores flattened laterally, globoid or broadly ellipsoid when pores are seen in face view, 24–29 by 24–34 μ, narrowly ellipsoid or oblong when pores are seen in optical section, 14–20 by 24–34 μ; wall cinnamon-brown, 1.5–2.5 μ thick, moderately echinulate except over a variable area surrounding the pores which is smooth, the pores 2, opposite and equatorial.

III. Telia amphigenous, chiefly hypophyllous, occasionally caulicolous, scattered or gregarious, round, 0.5–1.5 mm. across when on blade of leaf, elongate and confluent to 3–5 mm. when on stems, pulvinate, becoming somewhat pulverulent, chocolate-brown, early naked, ruptured epidermis noticeable; teliospores broadly ellipsoid or oblong, 26–40 by 32–58 μ; rounded or obtuse above, rounded or occasionally slightly narrowed below, slightly or not constricted at septum; wall chestnut-brown, smooth, 3–6 μ thick, slightly thickened at apex and over pore of lower cell near septum by a low or frequently somewhat abrupt subhyaline umbo; pedicel colorless, 5–9 μ thick, fragile, flexuose, the wall thin, once to several times length of spore, often deciduous.

ON CARDUACEAE:
Barroetia subuligera (Schauer) A. Gray, Aquascalientes.
Coleosanthus Coulteri (A. Gray) Kuntze (*Brickellia Coulteri* A. Gray), Arizona.
Coleosanthus megalodontus (Greenm.) Arth., (*Brickellia megalodonta* Greenm.), Jalisco.
Kuhnia eupatorioides L., Illinois, Indiana, Iowa, Mississippi, Missouri, Nebraska.
Kuhnia glutinosa Ell., Kansas, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin, Wyoming.
Kuhnia Hitchcockii A. Nelson, Colorado, Montana.
Kuhnia leptophylla Scheele (*K. Gooddingii* A. Nelson), Colorado.
Kuhnia rosmarinifolia Vent., New Mexico, Texas.

TYPE LOCALITY: "Bethlehem, Pennsylvania," probably error for Hope, Indiana, on *Kuhnia* sp.
DISTRIBUTION: Northern Indiana to Montana and southward to central Mexico.
EXSICCATI: Barth. Fungi Columb. *2360, 3946, 4268;* Barth. N. Am. Ured. *152, 243, 350, 644, 1765, 2152, 2361;* Ellis & Ev. Fungi Columb. *1454, 2152;* Ellis, N. Am. Fungi *1054;* D. Griff. W. Am. Fungi *95, 270;* Rab.-Paz. Fungi Eur. *4126;* Seym. & Earle, Econ. Fungi Suppl. *B14;* Sydow, Ured. *69.*

48. **Bullaria subdecora** (Sydow & Holway) Arthur & Mains.

Puccinia subdecora Sydow & Holway; Sydow, Ann. Myc. 1: 17. 1903.

O. Pycnia imperfectly known, caulicolous, gregarious, inconspicuous, globoid, 80–100 μ in diameter; ostiolar filaments short.

II. Uredinia amphigenous, scattered or gregarious, round or oblong, 0.3–0.5 mm. across or more elongate and often confluent when caulicolous, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, occasionally pyriform, somewhat flattened laterally, 19–26 by 26–34 μ; wall cinnamon-brown, uniformly 1.5–3.5 μ thick, inconspicuously and moderately echinulate, often with smooth area about the pore, the pores 2, equatorial or superequatorial.

III. Telia amphigenous, chiefly hypophyllous, occasionally caulicolous, scattered, round, 1–1.5 mm. across or oval and often confluent when caulicolous, early naked, somewhat pulverulent, pulvinate, chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 21–30 by 35–52 μ, rounded or obtuse above, rounded or somewhat tapering below, slightly constricted at septum; wall chestnut-brown, finely and inconspicuously verrucose-rugose, 2–5 μ thick, a semi-hyaline thickening over apex and pore of lower cell, 5–8 μ, the pore of lower cell at septum or midway between septum and pedicel; pedicel colorless, short, broad at point of attachment, 9–10 μ, tapering below, largely deciduous.

ON CARDUACEAE:
Coleosanthus grandiflorus (Hook.) Kuntze (*Brickellia grandiflora* Nutt.), Colorado, Utah.
TYPE LOCALITY: Georgetown, Colorado, on *Brickellia grandiflora.*
DISTRIBUTION: Central Colorado to central Utah.
EXSICCATI: Barth. N. Am. Ured. *2471;* Clements, Crypt. Form. Colo. *577;* Garrett, Fungi Utah. *239.*

49. Bullaria (?) decora (Dietel & Holway) Arthur & Mains.

Puccinia pinguis Dietel & Holway; Holway, Bot. Gaz. **24**: 34. Jl 1897. Not *P. pinguis* Dietel, F 1897.
Puccinia decora Dietel & Holway, Hedwigia **37**: 202. 1898.

O. Pycnia unknown.

II. Uredinia amphigenous, chiefly hypophyllous, numerous, scattered, small, 0.2–0.5 mm. across, early naked, becoming pulverulent, cinnamon-brown, ruptured epidermis scarcely noticeable; urediniospores ellipsoid or broadly ellipsoid, 24–28 by 28–32 μ, slightly flattened laterally; wall chestnut-brown, uniformly 2.5–3.5 μ thick when viewed with pores in face view, when seen in optical section 1.5–2 μ at sides and 2.5–3.5 μ at apex and base, inconspicuously and somewhat sparsely echinulate, the pores 2, equatorial, each covered with a noticeable hyaline cap.

III. Telia hypophyllous, few, scattered, small, 0.2–0.5 mm. across, early naked, becoming pulverulent, chestnut-brown, ruptured epidermis not conspicuous; teliospores broadly ellipsoid, 32–35 by 42–50 μ, rounded above and below, scarcely constricted at septum; wall chestnut-brown, 4–6 μ thick, thickened above, 8–10 μ, concolorous, or with semi-hyaline umbo, also similarly thickened over pore of lower cell which is situated approximately half way between the septum and pedicel, smooth; pedicel colorless, short, the wall thin.

ON CARDUACEAE:
Coleosanthus sp. (*Brickellia* sp.), Mexico (state).
TYPE LOCALITY: Rio Hondo, near City of Mexico, Mexico, on *Brickellia* sp.
DISTRIBUTION: Known only from the type locality.

50. Bullaria Baccharidis-multiflorae (Dietel & Holway) Arthur & Mains.

Puccinia Baccharidis-multiflorae Dietel & Holway; Holway, Bot. Gaz. **31**: 331. 1901.
Eriosporangium Baccharidis-multiflorae Arth. Résult. Sci. Congr. Bot. Vienne 343. 1906.
Argomyces Baccharidis-multiflorae Arth. N. Am. Flora **7**: 218. 1912.

O. Pycnia epiphyllous, few in a group, flattened-globoid, 100–112 μ broad by 70–90 μ high; ostiolar filaments 29–32 μ long.

II. Uredinia of the primary form epiphyllous, surrounding the pycnia; uredinia of the secondary form hypophyllous, scattered, round, 0.2–0.5 mm. across, early naked, pulverulent, bright cinnamon-brown, ruptured epidermis evident; urediniospores obovate, 21–29 by 30–39 μ, rounded or obtuse above, usually narrowed below; wall golden-brown, moderately thin, 1–2 μ, greatly thickened above, 3–7 μ, strongly and sparsely echinulate with points about 3 μ apart, the pores 3, prominent, equatorial, usually covered by the inflated cuticle.

III. Telia hypophyllous, scattered, round, 0.3–0.7 mm. across, pulvinate, light chestnut-brown, or cinereous by germination, ruptured epidermis inconspicuous; teliospores broadly oblong or oblong-obovate, 21–27 by 40–50 μ, rounded or obtuse at both ends, slightly constricted at septum; wall smooth, cinnamon-brown, often paler above, thin, 1–1.5 μ, greatly thickened above, 5–12 μ, also greatly thickened over pore of lower cell close to septum, 3–7 μ; pedicel nearly or quite colorless, terete, slender, 5–7 μ thick, one half to once and a half length of spore.

ON CARDUACEAE:
Baccharis elegans H.B.K., Oaxaca.
Baccharis multiflora H.B.K., Mexico (state).
Baccharis serraefolia DC., Guatemala.
TYPE LOCALITY: Amecameca, Mexico, on *Baccharis multiflora*.
DISTRIBUTION: Southern Mexico and Central America.

51. Bullaria triannulata (Berk. & Curt.) Arthur & Mains.

Uromyces triannulatus Berk. & Curt.; Berk. Grevillea **3**: 56. 1874.
Puccinia mirifica Dietel & Holway; Dietel, Erythea **3**: 79. 1895.
Caeomurus triannulatus Kuntze, Rev. Gen. **3³**: 451. 1898.
Dicaeoma triannulatum Arth. Résult. Sci. Congr. Bot. Vienne 344. 1906.
Puccinia triannulata H. S. Jackson, Mycologia **14**: 111. 1922.

O. Pycnia chiefly hypophyllous, scattered over large areas, numerous, preceding or accompanying the uredinia, prominent, honey-yellow becoming blackish-brown, flattened-globoid, 128–144 μ in diameter by 65–90 μ high; ostiolar filaments 50–85 μ long.

II. Uredinia hypophyllous, evenly and densely scattered over large areas from a diffused mycelium, early naked, roundish or oblong, prominent, 0.5 mm. across, pulverulent, dark cinnamon-brown, ruptured epidermis overarching and conspicuous; urediniospores obovoid or globoid, 19–24 by 24–32 μ; wall cinnamon-brown, moderately thick, 2–3 μ, evenly echinulate, the pores 2, superequatorial, irregularly disposed.

III. Telia hypophyllous, evenly and densely scattered over large areas from a diffused mycelium, early naked, roundish or oblong, prominent, 0.5 mm. across, somewhat pulverulent, dark cinnamon-brown, ruptured epidermis overarching and conspicuous; teliospores irregularly ellipsoid or obovate-ellipsoid, 23–30 by 40–52 μ, rounded or rarely obtuse at both ends, often slightly narrowed below, slightly or not constricted at septum; wall dark cinnamon-brown, moderately and uniformly thick, 3 μ, closely and finely verrucose; pedicel colorless, short, largely deciduous.

ON CARDUACEAE:
Borrichia arborescens (L.) DC., Florida; Bahamas; Bermuda.
Borrichia frutescens (L.) DC., Florida, South Carolina, Texas.
TYPE LOCALITY: South Carolina, on *Borrichia frutescens*.
DISTRIBUTION: South Carolina to Florida and southern Texas and in the Bahama and Bermuda islands.
EXSICCATI: Barth. Fungi Columb. *4061;* Barth. N. Am. Ured. *157*.

52. **Bullaria Balsamorhizae** (Peck) Arthur & Mains.

Trichobasis Balsamorhizae Peck, Bot. Gaz. **6**: 276. 1881.
Uredo Balsamorhizae De-Toni; Sacc. Syll. Fung. **7**: 842. 1882.
Trichobasis Wyethiae Peck, Bot. Gaz. **7**: 45. 1882.
Puccinia Balsamorhizae Peck, Bull. Torrey Club **11**: 49. 1884.
Puccinia Wyethiae Peck; Hark. Bull. Calif. Acad. **2**: 442. 1887.
Dicaeoma Balsamorhizae Kuntze, Rev. Gen. **3**[3]: 468. 1898.

O. Pycnia petiolicolous or subcostal, few, gregarious, inconspicuous, orange-yellow, flask-shaped, 70–100 by 100–130 μ; ostiolar filaments slightly projecting.

II. Uredinia amphigenous, scattered or gregarious, 0.5–1 mm. across, often confluent on petioles and veins, 1–5 mm. in length, early naked, pulverulent, chestnut-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, slightly flattened laterally, 23–30 by 26–32 μ; wall chestnut-brown, 2–3 μ thick, minutely and moderately echinulate, the pores 2, opposite, usually superequatorial.

III. Telia amphigenous, scattered, round, 0.5–1 mm. across, often confluent and elongate on petioles and veins, 1–5 mm. in length, early naked, somewhat pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores ellipsoid, rarely obovate-ellipsoid, 20–27 by 30–45 μ, rounded or sometimes obtuse at both ends, not constricted at septum; wall dark chestnut-brown, 2–3 μ thick, slightly thickened at apex to 4 μ, minutely and inconspicuously verrucose, markings often arranged in striae; pedicel colorless, deciduous.

ON CARDUACEAE:
Balsamorhiza deltoidea Nutt., California, Idaho, Oregon, Washington.
Balsamorhiza hirsuta Nutt., Idaho.
Balsamorhiza incana Nutt., Montana, Wyoming.
Balsamorhiza macrophylla Nutt., Utah.
Balsamorhiza sagittata (Pursh) Nutt., California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming; British Columbia,
Wyethia amplexicaulis Nutt., Colorado, Utah.
Wyethia angustifolia (DC.) Nutt., California.
Wyethia arizonica A. Gray, Colorado, Utah.
Wyethia mollis A. Gray, California.
TYPE LOCALITY: [Salt Lake City], Utah, on *Balsamorhiza macrophylla*.
DISTRIBUTION: Montana to British Columbia and southward to southern Colorado and central California.
EXSICCATI: Barth. Fungi Columb. *4350, 4454, 4752, 4843;* Barth. N. Am. Ured. *278, 776, 927, 1134, 1223, 1335, 1479, 1530, 1635, 1833, 1977, 2142;* Ellis & Ev. Fungi Columb. *986, 1380, 1870;* Ellis & Ev. N. Am. Fungi *1833, 2987;* Garrett, Fungi Utah, *11, 61, 62, 63, 154;* D. Griff. W. Am. Fungi *245, 245a, b, 271;* Sydow, Ured. *888, 1908, 1909, 1910, 1946*.

53. **Bullaria proba** (Jackson & Holway) Arthur & Mains.

Puccinia proba Jackson & Holway; Arth. Mycologia **10**: 143. 1918.

O. Pycnia epiphyllous, few, gregarious, noticeable, orange becoming brownish, globoid or flask-shaped, 50–65 by 50–80 μ; ostiolar filaments short.

II. Uredinia of the primary form epiphyllous, crowded on slightly raised spots surrounding the pycnia; secondary uredinia chiefly hypophyllous, scattered or gregarious, roundish, small, 0.2–0.4 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores of both forms obovoid or broadly ellipsoid, 16–19 by 20–24 μ; wall colorless or light golden-yellow, 1–1.5 μ, finely and moderately echinulate, the pores 2, equatorial.

III. Telia chiefly hypophyllous, scattered, round, small, 0.2–0.4 mm. across, early naked, pulvinate, chocolate-brown becoming cinereous from germination, ruptured epidermis conspicuous; teliospores ellipsoid or obovate, 16–20 by 26–34 μ, rounded above, rounded or somewhat tapering below, not or slightly constricted at septum; wall in the germinating condition cinnamon- or light chestnut-brown, obscurely verrucose above, smooth below, 1–2 μ thick, in the resting condition chocolate-brown, uniformly and finely verrucose-rugose, 2–3 μ thick, thicker at apex, 3–7 μ by a broad lighter-colored umbo; pedicel colorless, once to once and a half length of spore, or more frequently deciduous.

ON CARDUACEAE:
Zexmenia elegans Schultz-Bip., Guatemala.
Zexmenia frutescens (Mill.) Blake, Costa Rica; Guatemala.
Zexmenia Salvinii Hemsl., Guatemala.
TYPE LOCALITY: Quirigua, Guatemala, on *Zexmenia frutescens*.
DISTRIBUTION: Central America.

54. **Bullaria Enceliae** (Dietel & Holway) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Puccinia Enceliae Dietel & Holway; Holway, Bot. Gaz. 24: 32. 1897.

O. Pycnia amphigenous, in loose orbicular groups 1–2 mm. across, prominent, honey-yellow becoming light-brown, globoid, 110–150 μ in diameter; ostiolar filaments 100–130 μ long.

II. Uredinia of the primary form amphigenous, oblong, confluent with a ring about the pycnia, prominent, pulvinate, 0.4–0.6 mm. across, dark cinnamon-brown; uredinia of the secondary form hypophyllous, scattered, round, small, 0.3–0.5 mm. across, pulverulent, light cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid or obovate-globoid, 18–24 by 20–28 μ; wall cinnamon-brown, moderately thin, 1.5–2 μ, closely and minutely echinulate, the pores 2, equatorial.

III. Telia hypophyllous, scattered, early naked, round, 0.3–0.5 mm. across, pulvinate, blackish-brown, ruptured epidermis inconspicuous; teliospores elliptic or obovate-ellipsoid, 22–29 by 30–42 μ, rounded at both ends, or slightly narrowed below, slightly constricted at septum; wall chestnut-brown, moderately thick, 2–3 μ, thicker above by a broad umbo, 6–9 μ, smooth; pedicel colorless, firm, once to twice length of spore.

ON CARDUACEAE:
Geraea viscida (A. Gray) Blake (*Encelia viscida* A. Gray), California.
Simsia adenophora (Greenm.) Blake (*Encelia adenophora* Greenm.), Jalisco, Oaxaca.
Simsia foetida (Cav.) Blake (*Encelia mexicana* Mart.), Morelos.
Simsia Holwayi Blake, Guatemala.
Simsia polycephala (Hemsl.) Benth. (*Encelia polycephala* Hemsl.), Guatemala.
Simsia sericea (Hemsl.) Blake (*Encelia sericea* Hemsl.), Guatemala.
TYPE LOCALITY: Cuernavaca, Mexico, on *Encelia mexicana*.
DISTRIBUTION: From southern California through Mexico and Central America.
EXSICCATI: Barth. N. Am. Ured. *235, 340, 1240*.

55. **Bullaria Gaillardiae** (Dietel & Holway) Arthur & Mains.

Uredo Gaillardiae Dietel & Holway; Dietel, Erythea 7: 98. 1899.

O. Pycnia amphigenous, thickly scattered over large areas, punctiform, dark-brown, prominent, globoid, 80–128 μ in diameter; ostiolar filaments 32–55 μ long.

II. Uredinia hypophyllous, loosely scattered from a diffused mycelium, early naked, applanate, round, large, 0.4–0.6 mm. across, moderately pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 24–30 by 28–33 μ, often somewhat flattened on the sides bearing pores; wall cinnamon-brown, moderately thick, 2–3 μ, evenly echinulate, the pores 2, equatorial.

III. Telia unknown.

ON CARDUACEAE:
Gaillardia aristata Pursh, California.
TYPE LOCALITY: Sisson, California, on *Gaillardia aristata*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *1384*.

56. Bullaria (?) Chrysanthemi (Roze) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Puccinia Chrysanthemi Roze, Bull. Soc. Myc. Fr. **17**: 92. 1900.
Puccinia Chrysanthemi-chinensis P. Henn. Hedwigia Beibl. **40**: 26. 1901.
Dicaeoma Chrysanthemi Arth. Proc. Ind. Acad. Sci. **1903**: 147. 1904.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, round, often confluent, early naked, large, 0.5–1 mm. in diameter, pulverulent, chestnut-brown, ruptured epidermis usually noticeable; urediniospores globoid or broadly ellipsoid, 20–25 by 25–34 μ, sometimes two-celled; wall cinnamon- or chestnut-brown, 1.5–2 μ thick, closely and moderately echinulate, the pores 3, approximately equatorial.

III. Telia hypophyllous, scattered, roundish, 0.3–0.8 mm. across, early naked, pulvinate, dark chocolate-brown, ruptured epidermis noticeable; teliospores elliptic or obovate-ellipsoid, 18–28 by 34–57 μ, rounded or obtuse at both ends, slightly or not constricted at septum; wall chestnut-brown, 1–2 μ thick, thicker above, 5–10 μ, finely and moderately verrucose; pedicel colorless, once to twice length of spore.

ON CARDUACEAE:
Chrysanthemum morifolium Ramat. (*C. sinense* Sabine), Alabama, California, Delaware, Indiana, Maryland, Massachusetts, Michigan, Montana, New Jersey, Oregon, Pennsylvania, Tennessee, West Virginia; Ontario.
TYPE LOCALITY: France, on "*Chrysanthemum indicum*," probably identical with *C. morifolium*.
DISTRIBUTION: In greenhouses in the uredinial form only, quite largely throughout the temperate part of North America; similarly in Europe, Australia, New Zealand, and Japan, telia occurring only in the last named country.
ILLUSTRATIONS: Grove, Brit. Rust Fungi *f. 83, 84;* Centr. Bakt. II. Abth. **10**: 373–376, *f. 1–7;* McAlpine, Rusts Austr. *pl. E. f. 21, pl. 29, f. 251–255;* Rostr. Plantep. Haandb. *f. 94;* Fl. Ital. Crypt. Ured. *f. 54*.
EXSICCATI: Barth. N. Am. Ured. *1431, 1639;* Ellis & Ev. Fungi Columb. *1956, 2052;* Rel. Farl. *246*.

57. Bullaria Absinthii (Hedw. f.) Arthur & Mains.

Uredo (*Puccinia*) *Absinthii* Hedw. f.; Poir, in Lam. Encyc. **8**: 245. 1808.
Puccinia Absinthii DC. Fl. Fr. **6**: 56. 1815.
Puccinia Artemisiarum Schmidt & Kuntze, Deuts. Schwämme **4**: 5. 1816.
Caeoma Artemisiae Link, in Willd. Sp. Pl. **6**[2]: 19. 1825.
Puccinia discoidearum Artemisiarum Wallr. Fl. Crypt. Germ. **2**: 222. 1833.
Uredo Artemisiae Rab. Deutschl. Krypt.-Fl. **1**: 12. 1844.
Caeoma Absinthii Corda, Ic. Fung. **6**: 1. 1854.
Trichobasis Artemisiae Berk.; Cooke, Micr. Fungi 209. 1865.
Puccinia Artemisiae Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 55. 1870.
Puccinia similis Ellis & Ev. Bull. Torrey Club **25**: 508. 1898.
Puccinia artemisiella Sydow, Monog. Ured. **1**: 14. 1902.

O. Pycnia not seen.

II. Uredinia chiefly hypophyllous, scattered, round, 0.3–0.5 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis noticeable; urediniospores obovate or ellipsoid, 20–26 by 24–34 μ; wall golden-brown, 1.5–2.5 μ, minutely and moderately echinulate, the pores 3, equatorial.

III. Telia chiefly hypophyllous, scattered, round or oblong, 0.5–1 mm. across, early naked, pulverulent, dark chocolate-brown or blackish, ruptured epidermis usually inconspicuous; teliospores ellipsoid or oblong, 20–28 by 40–60 μ, obtuse or rounded above, usually somewhat narrowed below, scarcely constricted at septum; wall chestnut-brown, minutely rugose, especially above, or smooth, moderately thick, 1.5–2.5 μ, thickened above, 6–12 μ, concolorous; pedicel nearly colorless, thick, 6–10 μ, once to once and a half length of spore.

ON CARDUACEAE:
Artemisia arbuscula Nutt., Wyoming.
Artemisia aromatica A. Nelson, Colorado, Idaho, Montana, Utah, Wyoming.

Artemisia Bigelovii A. Gray, Utah.
Artemisia Brittonii Rydb., Colorado.
Artemisia californica Less., California.
Artemisia camporum Rydb., Colorado.
Artemisia cana Pursh, Colorado, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Wyoming.
Artemisia cana viscidula Osterhout, Colorado.
Artemisia coloradensis Osterhout, Colorado.
Artemisia diversifolia Rydb., Colorado.
Artemisia Douglasiana Bess., California, Oregon.
Artemisia dracunculoides Pursh, Arizona, California, Colorado, Iowa, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wisconsin.
Artemisia elatior (T. & G.) Rydb., California.
Artemisia frigida Willd., Oregon; Alberta.
Artemisia gnaphalodes Nutt., Colorado, Iowa, Kansas, Missouri, Montana, Nebraska, Oklahoma, Oregon.
Artemisia heterophylla Nutt., California.
Artemisia kansana Britton, Texas.
Artemisia longifolia Nutt., South Dakota.
Artemisia ludoviciana Nutt., Arizona, California, Colorado, Kansas, Montana, Nebraska, North Dakota, Oregon, South Dakota, Washington, Wisconsin; British Columbia.
Artemisia mexicana Willd., Texas; Chihuahua, Mexico (state).
Artemisia nova A. Nelson, New Mexico, Utah.
Artemisia Parishii A. Gray, Nevada.
Artemisia Purshiana Bess., Montana.
Artemisia pycnocephala DC., California.
Artemisia redolens A. Gray, New Mexico; Chihuahua.
Artemisia rigida (Nutt.) A. Gray, California, Oregon, Washington.
Artemisia serrata Nutt., Iowa.
Artemisia silvicola Osterhout, New Mexico.
Artemisia spinescens D. C. Eaton, Idaho.
Artemisia Suksdorfii Piper, California.
Artemisia tridentata Nutt., California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, Wyoming.
Artemisia tripartita Rydb., Idaho, Wyoming.
Artemisia viscidula Osterhout, Colorado.
Artemisia vulgaris L., Costa Rica.
Artemisia Wrightii A. Gray, Arizona, New Mexico.
Sphaeromeria capitata Nutt., Wyoming.
Sphaeromeria diversifolia (D. C. Eaton) Rydb., Utah.

TYPE LOCALITY: Vicinity of Mende, France, on *Artemisia Absinthium*.

DISTRIBUTION: North Dakota to Wisconsin and Texas, westward to the Pacific coast, and southward through Central America; also in Europe.

ILLUSTRATIONS: Corda, Ic. Fung. **4**: *pl. 4, f. 43;* Grove, Brit. Rust Fungi *f. 86;* Beitr. Krypt. Schweiz 2^2: *f. 148;* Fl. Ital. Crypt. Ured. *f. 52a.*

EXSICCATI: Barth. Fungi Columb. *2346, 2445, 2753, 3737, 3738, 4252, 4253, 4346, 4450, 4561, 4838, 4947, 5046, 5047, 5048;* Barth. N. Am. Ured. *16, 221, 321, 322, 725, 726, 921, 1020, 1021, 1022, 1216, 1324, 1325, 1517, 1629, 1738, 1739, 1826, 1827, 1828, 2026, 2027, 2127, 2128, 2129, 2222, 2421;* Brenckle, Fungi Dak. *418;* Clements, Crypt. Form. Colo. *544;* Ellis & Ev. Fungi Columb. *754b' 1665, 1757, 1844, 2050, 2140;* Ellis & Ev. N. Am. Fungi *1848 a, b, 2250;* Garrett, Fungi Utah. *79, 80, 181;* D. Griff. W. Am. Fungi *86, 86a, 248, 261, 354, 354b;* Sydow, Ured. *836, 886, 1706, 1964.*

58. **Bullaria Cirsii** (Lasch) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Puccinia Cirsii Lasch; Rab. Fungi Eur. *89.* 1859.
Uredo Cirsii Lasch; Rab. Fungi Eur. *90.* 1859.
Puccinia californica Dietel, Bot. Gaz. **18**: 254. 1893.
Puccinia Laschii Lagerh. Tromsö Mus. Aarsh. **17**: 63. 1895.
Puccinia inclusa Sydow, Monog. Ured. **1**: 56. 1902.

O. Pycnia chiefly epiphyllous, crowded in small groups, inconspicuous, punctiform, immersed, dark golden-brown, globoid, 100–135 μ broad; ostiolar filaments 30–40 μ long, free, becoming agglutinate.

II. Uredinia amphigenous, chiefly hypophyllous, scattered or gregarious, or at first encircling the pycnia, round, usually small, 0.3–1 mm. across, early naked, pulverulent, light chestnut-brown, ruptured epidermis generally inconspicuous; urediniospores globoid or globose, 22–28 by 24–32 μ; wall golden-brown, moderately thick, 1.5–2.5 μ, sparsely or moderately and minutely echinulate, the pores 3, rarely 4, equatorial.

III. Telia amphigenous, chiefly hypophyllous, irregularly scattered or occasionally gregarious, round, usually small, 0.3–1 mm. across, early naked, somewhat pulverulent, dark chestnut-brown, ruptured epidermis generally inconspicuous; teliospores broadly ellipsoid,

22–28 by 28–45 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, closely and minutely verrucose with markings often arranged in longitudinal lines, or nearly smooth, very slightly or not thickened at apex, the pores of either cell usually depressed one third; pedicel colorless, fragile, usually very short, rarely equaling the spore.

ON CARDUACEAE:

Cirsium acaulescens (A. Gray) K. Schumann (*C. americanum* K. Schumann, *Carduus acaulescens* Rydb., *C. Drummondii acaulescens* Coville, *Cnicus Drummondii acaulescens* A. Gray), California, Colorado, Oregon, Utah.
Cirsium altissimum (L.) Spreng. (*Carduus altissimus* L., *Cnicus altissimus* Willd.), Delaware, Iowa, Kansas, Minnesota, Missouri, Nebraska, Pennsylvania, South Dakota.
Cirsium arizonicum (A. Gray) Petrak (*Carduus arizonicus* Greene, *Cnicus arizonicus* A. Gray), Arizona, New Mexico.
Cirsium Breweri (A. Gray) Jepson (*Cnicus Breweri* A. Gray), California, Washington.
Cirsium californicum A. Gray (*Carduus californicus* Greene), California.
Cirsium canescens Nutt., Colorado.
Cirsium Centaureae (Rydb.) K. Schumann (*Carduus Centaureae* Rydb., *C. americanus* Greene), Colorado.
Cirsium coloradense (Rydb.) Cockerell (*Carduus coloradensis* Rydb.), New Mexico.
Cirsium discolor (Muhl.) Spreng. (*Carduus discolor* Nutt., *Cnicus discolor* Muhl.), Iowa, New Jersey, Oklahoma.
Cirsium Drummondii T. & G. (*Carduus Drummondii* Coville, *Cnicus Drummondii* A. Gray), Colorado, Nevada, Utah, Wyoming.
Cirsium Eatoni (A. Gray) B. L. Robinson (*Carduus leiocephalus* A. Heller), Utah.
Cirsium edule Nutt. (*Carduus edulis* Greene, *Cnicus edulis* A. Gray), California, Oregon, Washington.
Cirsium Flodmannii (Rydb.) Arth. (*Carduus Flodmannii* Rydb.), North Dakota.
Cirsium foliosum (Hook.) DC., Idaho.
Cirsium griseum (Rydb.) K. Schumann, Colorado.
Cirsium Hookerianum Nutt. (*Carduus Hookerianus* A. Heller), Montana.
Cirsium inornatum Wooton & Standley, New Mexico.
Cirsium lanceolatum (L.) Hill (*Carduus lanceolatus* L., *Cnicus lanceolatus* Willd.), Louisiana, Montana, Wisconsin.
Cirsium lomatolepis (Hemsl.) Petrak (*Cnicus lomatolepis* Hemsl.), Mexico (state).
Cirsium megacephalum (A. Gray) Cockerell (*Carduus undulatus megacephalus* Greene, *Cnicus undulatus megacephalus* A. Gray), Colorado, Nebraska, Oklahoma.
Cirsium Nelsonii (Pammel) Rydb. (*Cnicus Nelsonii* Pammel, *Carduus Nelsonii* Pammel), Wyoming.
Cirsium neomexicanum A. Gray (*Carduus neomexicanus* Greene), Colorado.
Cirsium ochrocentrum A. Gray (*Carduus ochrocentrus* Greene, *Cnicus ochrocentrus* A. Gray), Colorado, New Mexico, Wyoming.
Cirsium occidentale (Nutt.) Jepson (*Carduus occidentalis* Nutt., *Cnicus occidentalis* A. Gray), California.
Cirsium oreophilum Rydb. (*Carduus oreophilus* Rydb.), Colorado.
Cirsium palousense Piper, Idaho.
Cirsium pallidum Wooton & Standley, New Mexico.
Cirsium Parryi (A. Gray) Petrak (*Cnicus Parryi* A. Gray), Colorado.
Cirsium perennans (Greene) Wooton & Standley, New Mexico.
Cirsium perplexans Rydb. (*Carduus americanus perplexans* A. Nelson), Colorado.
Cirsium plattense (Rydb.) Cockerell (*Carduus plattensis* Rydb.), Colorado, Nebraska.
Cirsium pulchellum (Greene) Wooton & Standley (*Carduus pulchellus* Greene), Utah.
Cirsium quercetorum (A. Gray) Jepson (*Cnicus quercetorum* A. Gray), California.
Cirsium remotifolium (Hook.) DC. (*Carduus remotifolius* Hook.), Washington.
Cirsium scopulorum (Greene) Cockerell (*C. eriocephalum* A. Gray, *Cnicus eriocephalus* A. Gray, *Carduus scopulorum* Greene), Colorado, Montana, Wyoming.
Cirsium spathulifolium Rydb. (*Carduus spathulatus* Osterhout), Colorado.
Cirsium Tracyi Rydb. (*Carduus Tracyi* Rydb.), Colorado.
Cirsium undulatum (Nutt.) Spreng. (*Carduus undulatus* Nutt., *Cnicus undulatus* A. Gray, *C. undulatus Douglasii* Greene), California, Colorado, Indiana, Kansas, Montana, New Mexico, Oregon, South Dakota, Utah; Alberta.
Cirsium vernale (Osterhout) Cockerell (*Carduus vernalis* Osterhout), Colorado.
Cirsium virginianum (L.) Michx. (*Carduus virginianus* L., *Cnicus virginianus* Pursh), North Carolina.
Cirsium Wrightii A. Gray (*Carduus Wrightii* A. Heller), Arizona.
Cirsium sp., Texas; Michoacan, Oaxaca; Costa Rica.

TYPE LOCALITY: Near Driesen, Germany, on *Cirsium oleraceum*.

DISTRIBUTION: Alberta and North Dakota southward to Louisiana and Costa Rica, as well as from New Jersey and North Carolina westward to Minnesota and Missouri, being especially abundant in the western mountains; also in Europe and Asia.

ILLUSTRATIONS: Beitr. Krypt. Schweiz 2²: *f. 168–171;* Ber. Deuts. Bot. Ges. 11: *pl. 21, f. 31–33, 40–48;* Zeits. Pflanzenkr. 9: 287, *f. 9–12;* Grove, Brit. Rust Fungi *f. 94, 95.*

EXSICCATI: Barth. Fungi Columb. *2353, 2757, 3549, 3652, 3747, 3748, 4055, 4352, 4566;* Barth. N. Am. Ured. *28, 131, 132, 230, 537, 629, 735, 934, 935, 1034, 1035, 1143, 1227, 1340, 1750, 2345;* Brenckle, Fungi Dakot. *64;* Clements, Crypt. Form. Colo. *318, 553;* Ellis & Ev. Fungi Columb. *1571, 2142;* Ellis & Ev. N. Am. Fungi *2253, 2254;* Garrett, Fungi Utah. *69, 93, 132;* D. Griff. W. Am. Fungi *356;* Seym. & Earle, Econ. Fungi *306;* Sydow, Ured. *1581, 1772, 2269;* Zahlbr. Krypt. *2010.*

59. **Bullaria suaveolens** (Pers.) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Uredo suaveolens Pers. Obs. Myc. **2**: 24. 1799.
Uredo Serratulae Schum. Enum. Pl. Saell. **2**: 231. 1803.
Hypodermium (*Uredo*) *obtegens* Link, Ges. Nat. Freunde Berlin Mag. **7**: 27. 1815.
Caeoma suaveolens Schlecht. Fl. Berol. **2**: 127. 1824.
Erysibe suaveolens Wallr. Fl. Crypt. Germ. **2**: 206. 1833.
Sphaeronema Cirsii Lasch, Bot. Zeit. **4**: 878. 1846.
Puccinia obtegens Tul. Ann. Sci. Nat. Bot. IV, **2**: 87. 1854.
Trichobasis suaveolens Lév.; Berk. Outl. Brit. Fung. 332. 1860.
Puccinia suaveolens Rostr. Forh. Skand. Nat. **11**: 339. 1874.
Aecidiolum Cirsii Sacc. Michelia **1**: 12. 1877.
Dicaeoma suaveolens Kuntze, Rev. Gen. 3^3: 470. 1898.

O. Pycnia hypophyllous or epicostal and caulicolous, scattered evenly over large areas preceding or accompanying the primary uredinia, conspicuous, punctiform, globoid or somewhat conic, 90–185 μ broad, two thirds as high; pycniospores elliptic, 1 by 3 μ.

II. Uredinia of the primary form hypophyllous and caulicolous, round, 0.3–0.5 mm. across, scattered evenly over large areas, often confluent, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; uredinia of the secondary form scattered or gregarious; urediniospores globoid or broadly ellipsoid, 22–26 by 24–28 μ; wall thin, 1–1.5 μ, cinnamon-brown, closely and minutely echinulate, the pores 3, equatorial.

III. Telia hypophyllous and caulicolous, round, 0.3–0.5 mm. across, evenly scattered over large areas or somewhat gregarious, coalescing, or occasionally irregularly scattered, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 20–24 by 30–38 μ, rounded at both ends, slightly constricted at septum; wall light chestnut-brown, uniformly thin, 1.5–2 μ, closely and finely verrucose, the pore of lower cell half way between septum and base; pedicel colorless, fragile, short.

ON CARDUACEAE:
Cirsium arvense (L.) Scop. (*Carduus arvensis* Robson, *Cnicus arvensis* Hoffm., *Serratula arvensis* L.), Maine, Massachusetts, Michigan, New Jersey, New York, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Wisconsin; Nova Scotia, Ontario, Quebec.
TYPE LOCALITY: Europe, on *Serratula arvensis*.
DISTRIBUTION: New Jersey to South Dakota northward into Canada, and in Utah; also in Europe and Japan.
ILLUSTRATIONS: Zeits. Pflanzenkr. **9**: 292, *f. 17;* Grove, Brit. Rust Fungi *f. 97*.
EXSICCATI: Barth. Fungi Columb. *3562, 3854, 4155;* Barth. N. Am. Ured. *855, 1358, 1664, 1957;* Ellis & Ev. Fungi Columb. *484;* Ellis, N. Am. Fungi *1056;* Seym. & Earle, Econ. Fungi *303a–d, 304*.

60. **Bullaria Cyani** (Schleich.) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Uredo Cyani Schleich. (Pl. Crypt. Helv. *95*, hyponym. 1805); DC. Fl. Fr. **6**: 74. 1815.
Puccinia Cyani Pass.; Rab. Fungi Eur. *1767*. 1873.

O. Pycnia not seen.

II. Uredinia amphigenous or chiefly hypophyllous and caulicolous, scattered over wide areas evidently from a distributed mycelium, round or elliptic, 0.2–0.8 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 20–24 by 22–26 μ; wall cinnamon-brown, 1.5–2 μ, closely and minutely echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous and caulicolous, scattered over wide areas, round, 0.2–0.5 mm. across or somewhat elongate, early naked, somewhat pulverulent, dark chestnut-brown, ruptured epidermis noticeable; teliospores broadly ellipsoid, 24–28 by 32–40 μ, rounded at each end, not constricted at septum; wall chestnut-brown, uniformly 1.5–3 μ thick, minutely and closely verrucose, the apical pore usually depressed about one third toward septum, the pore of lower cell about midway between septum and pedicel; pedicel colorless, deciduous.

ON CARDUACEAE:
Centaurea Cyanus L., Delaware, Massachusetts, New Jersey, New York, Oregon, Pennsylvania.
TYPE LOCALITY: Switzerland, on *Centaurea Cyanus*.
DISTRIBUTION: Delaware to central Pennsylvania and in Oregon; also in Europe.
ILLUSTRATIONS: Corda, Ic. Fung. **4**: *pl. 5, f. 65;* Ber. Deuts. Bot. Ges. **11**: *pl. 21, f. 20–22;* Zeits. Pflanzenkr. **9**: 293, *f. 18*.
EXSICCATI: Barth. Fungi Columb. *3353*.

61. **Bullaria irrequisita** (H. S. Jackson) Arthur & Mains.

Puccinia irrequisita H. S. Jackson; Arth. Bull. Torrey Club **48**: 32. 1921.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, round, 0.3–0.5 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly ellipsoid, 20–23 by 23–26 μ; wall cinnamon-brown, 1–1.5 μ thick, moderately and finely echinulate, the pores 3, equatorial.

III. Telia amphigenous, chiefly epiphyllous, scattered, round, 0.3–0.5 mm. across, tardily naked, pulvinate, blackish-brown, or grayish from the overlying epidermis; teliospores irregularly ellipsoid, somewhat angular, 24–29 by 34–40 μ, rounded or obtuse above, rounded or truncate below, scarcely constricted at septum; wall chestnut-brown, 3–3.5 μ thick, not appreciably thickened above, obscurely and very finely verrucose; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Centaurea americana Nutt., Texas.
TYPE LOCALITY: Austin, Texas, on *Centaurea americana*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *1338*; Ellis & Ev. Fungi Columb. *1642*.

62. **Bullaria Carthami** (Corda) Arthur & Mains.

Puccinia Carthami Corda, Ic. Fung. **4**: 15. 1840.
Dicaeoma Carthami Huzelm.; Opiz, Seznam 139, as synonym. 1852.
Dicaeoma Carthami Kuntze, Rev. Gen. **3**^{3}: 468. 1898.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, round, small, 0.2–0.4 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis evident; urediniospores globose, globoid, or broadly ellipsoid, 17–23 by 22–26 μ; wall thin, 1.5–2 μ, light chestnut-brown, finely echinulate, the pores 3, rarely 4, equatorial.

III. Telia amphigenous, largely hypophyllous, scattered, round, 0.3–0.5 mm. across, early naked, pulverulent, blackish-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 23–29 by 32–42 μ, rounded or somewhat obtuse above and below, not or only slightly constricted at septum; wall chestnut-brown, uniformly 2–3 μ thick, closely and inconspicuously verruculose, the pore usually depressed from one third to one half length of each cell; pedicel colorless, delicate, fragile, mostly deciduous.

ON CARDUACEAE:
Carthamus tinctorius L., Massachusetts.
TYPE LOCALITY: Prag, Bohemia, on *Carthamus tinctorius*.
DISTRIBUTION: Cottage City, Massachusetts; also in Europe, northern Africa, India, and Japan.
ILLUSTRATION: Corda, Ic. Fung. **4**: *pl. 4, f. 52*.

63. **Bullaria Bardanae** (Corda) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Uredo apiculata Arctii Strauss, Ann. Wett. Ges. **2**: 98. 1810.
Puccinia inquinans Bardanae Wallr. Fl. Crypt. Germ. **2**: 219. 1833.
Puccinia Bardanae Corda, Ic. Fung. **4**: 17. 1840.
Puccinia Lappae Cast. Cat. Pl. Mars. 201. 1845.
Puccinia punctata Bon. Abh. Nat. Ges. Halle **5**: 220. 1860.

O. Pycnia epiphyllous, numerous, gregarious, noticeable, honey-yellow, conic, 130–160 by 95–125 μ; ostiolar filaments to 40 μ in length.

II. Uredinia of the primary sort epiphyllous, surrounding the pycnia; uredinia of the secondary sort amphigenous, scattered, small, round, 0.2–0.5 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 23–26 by 24–30 μ; wall 1.5–2 μ thick, light chestnut-brown, finely and moderately echinulate, the pores 3, equatorial.

III. Telia amphigenous, chiefly hypophyllous, scattered or gregarious, small, round, 0.2–0.5 mm. across, early naked, somewhat pulverulent, blackish-brown, ruptured epidermis not conspicuous; teliospores broadly ellipsoid, 23–26 by 34–38 μ, rounded at apex and base,

scarcely constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, slightly or not thickened over pores, the pore of upper cell usually depressed, that of the lower cell half way between septum and pedicel, closely and minutely verrucose; pedicel colorless, usually deciduous.

ON CARDUACEAE:
Arctium minus Schlecht., Illinois, Indiana, Massachusetts, Michigan, Missouri, New York, North Dakota, Pennsylvania, Virginia, West Virginia, Wisconsin; Nova Scotia, Ontario.
TYPE LOCALITY: Prag, Bohemia, on *Arctium Bardana*.
DISTRIBUTION: Virginia to Missouri and northward and northeastward into Canada; also in Europe.
ILLUSTRATIONS: Corda, Ic. Fung. **4**: *pl. 5, f. 63;* Beitr. Krypt. Schweiz **2**[2]: *221, f. 173;* Zeits. Pflanzenkr. **9**: 291, *f. 15;* Grove, Brit. Rust Fungi *f. 90.*
EXSICCATI: Barth. Fungi Columb. *4952;* Barth. N. Am. Ured. *1224, 1636, 1936, 2232, 2342, 2539, 2540;* Rel. Farl. *243.*

64. **Bullaria chondrillina** (Bubák & Sydow) Arthur & Mains.

Uredo Chondrillae Opiz, Seznam 151, hyponym. 1852.
Puccinia chondrillina Bubák & Sydow, Oesterr. Bot. Zeits. **51**: 17. 1901.

O. Pycnia amphigenous, honey-yellow, grouped among the primary uredinia, soon disappearing.

II. Uredinia of the primary form in large, circular or irregular groups, otherwise similar to the secondary form; secondary uredinia amphigenous or caulicolous, numerous, scattered or sometimes crowded on stems into elongate groups, round or irregular, 0.2–0.6 mm. in diameter, rather tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores of both forms obovoid or ellipsoid, 16–23 by 23–29 μ; wall cinnamon-brown, 1–1.5 μ, usually 1 μ thick, finely, closely and inconspicuously echinulate, the pores 2, superequatorial.

III. Telia amphigenous or caulicolous, scattered or crowded in groups of several sori, round or irregularly elongate, 0.2–0.8 mm. across, rather early naked, pulvinate, chestnut-brown, ruptured epidermis evident; teliospores ellipsoid or oblong, 19–23 by 30–39 μ, usually rounded above and below, slightly constricted at septum; wall dark cinnamon- or light chestnut-brown, of uniform thickness, thin, 1 μ or less, very finely and closely verrucose, noticeable only when dry, the pore in upper half of each cell; pedicel hyaline, as long as spore or shorter, fragile.

ON CICHORIACEAE:
Chondrilla juncea L., District of Columbia, Maryland, Virginia.
TYPE LOCALITY: Bohemia, on [*Chondrilla* sp. ?].
DISTRIBUTION: Northern Virginia to District of Columbia; also in Europe.
ILLUSTRATIONS: Krypt.-fl. Brand. Pilze **3**: *f. B74.*

65. **Bullaria Hieracii** (Schum.) Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

Uredo Hieracii Schum. Enum. Pl. Saell. **2**: 232. 1803.
Uredo Hyoseridis Schum. Enum. Pl. Saell. **2**: 233. 1803.
Puccinia Phaseoli Taraxaci Rebent, Prodr. Fl. Neom. 356. 1804.
Uredo Cichoracearum DC. Fl. Fr. **2**: 229. 1805.
Uredo flosculosorum Hieracii Strauss, Ann. Wett. Ges. **2**: 102. 1811.
Puccinia Hieracii H. Mart. Fl. Mosq. 226. 1812.
Puccinia flosculosorum Hieracii Röhling, Deuts. Fl. ed. 2. **3**: 131. 1813.
Uredo Cichorii DC. Fl. Fr. **6**: 74. 1815.
Puccinia Compositarum Schlecht. Fr. Berol. **2**: 133. 1824.
Caeoma Cichorii Link, in Willd. Sp. Pl. **6**[2]: 18. 1825.
Puccinia Cichorii Bellynck; Kickx. Fl. Crypt. Fland. **2**: 65. 1867.
Puccinia rugosa Billings, in S. Wats. Bot. King's Expl. 414. 1871.
Puccinia Hypochaeridis Oud. Nederl. Kruidk. Arch. II. **1**: 175. 1872.
Puccinia Endiviae Pass.; Thüm. Hedwigia **12**: 113. 1873.
Puccinia Troximontis Peck, Bot. Gaz. **6**: 227. 1881.
Puccinia Taraxaci Plowr. Brit. Ured. 186. 1889.
Dicaeoma Hieracii Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Taraxaci Kuntze, Rev. Gen. **3**[3]: 470. 1898. Not *D. Taraxaci* Kuntze, *loc. cit.* 467. 1898.
Dicaeoma Troximontis Kuntze, Rev. Gen. **3**[3]: 471. 1898.
Puccinia Leontodontis Jacky, Zeits. Pflanzenkr. **9**: 339. 1899.
Puccinia Crepidis-acuminatae Sydow, Oesterr. Bot. Zeits. **51**: 27. 1901.
Puccinia Krigiae Sydow, Monog. Ured. **1**: 104. 1902.
Puccinia Pyrrhopappi Sydow, Monog. Ured. **1**: 138. 1902.
Puccinia sejuncta Sydow, Ann. Myc. **1**: 326. 1903.

Dicaeoma sejunctum Arth. Résult. Sci. Congr. Bot. Vienne 344. 1906.
Bullaria Taraxaci Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia amphigenous, crowded in groups 0.8–2 mm. in diameter, noticeable, honey-yellow becoming chocolate-brown, flattened-globoid or globoid, 60–135 μ wide by 50–112 μ high; ostiolar filaments 25–80 μ long, often projecting beyond the ostiole and agglutinate into a column.

II. Uredinia of the primary form circinating about the pycnia, otherwise similar to the secondary form; secondary uredinia amphigenous or caulicolous, scattered or somewhat crowded in groups, round or oblong, 0.2–1 mm. in diameter or up to 2 mm. long, early or somewhat tardily naked, pulverulent, dark cinnamon- or golden-brown, ruptured epidermis conspicuous; urediniospores of both forms broadly ellipsoid, globoid, or obovoid, 17–28 by 21–32 μ; wall cinnamon-brown, 1–2.5 μ thick, moderately or closely echinulate, the pores 2 or sometimes 3, superequatorial or equatorial.

III. Telia amphigenous or caulicolous, scattered or somewhat grouped, round or oblong, 0.2–1 mm. across, early or somewhat tardily naked, sometimes pulvinate, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 18–29 by 26–42 μ, rounded above and below, not or slightly constricted at septum; wall chestnut-brown, uniform in thickness, 1–2.5 μ, closely or moderately and finely verrucose, the pore of the upper cell usually in upper half, of the lower cell variable; pedicel colorless, fragile.

ON CICHORIACEAE:

Adopogon virginicus (L.) Kuntze (*Cynthia virginica* D. Don, *Krigia amplexicaulis* Nutt.), North Carolina.
Agoseris agrestis Osterhout (*A. Leontodon* Rydb.), Utah.
Agoseris aurantiaca (Hook.) Greene (*Troximon aurantiacum* Hook.), Colorado, Washington.
Agoseris barbellulata Greene (*Troximon barbellulata* Greene), California.
Agoseris elata (Nutt.) Greene, Washington.
Agoseris glauca (Nutt.) Greene (*Troximon glaucum* Nutt.), Arizona, Colorado, Montana, Wyoming.
Agoseris gracilens (A. Gray) Kuntze (*Troximon gracilens* A. Gray), Colorado, Utah, Washington.
Agoseris graminifolia Greene (*Troximon gracilens Greenei* A. Gray), Colorado.
Agoseris grandiflora (Nutt.) Greene (*Troximon grandiflorum* A. Gray), Montana, Washington.
Agoseris heterophylla (Nutt.) Greene (*Troximon heterophyllum* Greene), Washington.
Agoseris hirsuta (Hook.) Greene (*Troximum humile* A. Gray), California.
Agoseris laciniata (Nutt.) Greene (*Troximon arachnoideum* A. Nelson), Oregon.
Agoseris leptocarpa Osterhout, Colorado.
Agoseris montana Osterhout, Colorado.
Agoseris plebia Greene, California.
Agoseris purpurea (A. Gray) Greene (*Troximon aurantiacum purpureum* A. Gray), Colorado, Wyoming.
Agoseris turbinata Rydb., Montana.
Agoseris villosa Rydb. (*Troximon villosum* A. Nelson), Montana.
Agoseris sp., British Columbia.
Apargia autumnalis (L.) Hoffm. (*Leontodon autumnale* L.), Maine; Nova Scotia.
Cichorium Endivia L., Connecticut.
Cichorium Intybus L., New York, Oregon, Vermont, Washington, Wisconsin; Nova Scotia, Ontario, Quebec; Bermuda.
Crepis acuminata Nutt., California, Colorado, Idaho, Montana, Nevada, Utah, Washington, Wyoming.
Crepis angustata Rydb., British Columbia.
Crepis glauca (Nutt.) T. & G., Utah.
Crepis gracilis (D. C. Eaton) Rydb., Idaho.
Crepis intermedia A. Gray, California, Colorado, Utah, Wyoming.
Crepis occidentalis Nutt., Colorado, Nevada, Utah.
Crepis pleurocarpa A. Gray, California.
Crepis runcinata (James) T. & G., Montana, North Dakota, Washington.
Crepis scopulorum Coville, Colorado, Idaho.
Crepis subacaulis (Kellogg) Coville (*C. occidentalis subacaulis* Kellogg), California, Utah.
Heteropleura Fendleri (Schultz-Bip.) Rydb. (*Hieracium Fendleri* Schultz-Bip.), Arizona, New Mexico.
Hieracium albiflorum Hook., Idaho, Montana, Oregon, Washington.
Hieracium canadense Michx., Connecticut, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Montana, Rhode Island, Washington, Wisconsin, Wyoming; Ontario, Quebec.
Hieracium cinereum Howell, Oregon.
Hieracium columbianum Rydb., Idaho, Montana, Washington.
Hieracium gracile Hook., Oregon.
Hieracium gracile detonsum A. Gray, California.
Hieracium griseum Rydb., Utah.

Hieracium Gronovii L., New York.
Hieracium horridum Fries, California.
Hieracium scabrum Michx., Delaware, Indiana, Maine, New York, Pennsylvania, Virginia, West Virginia; Nova Scotia.
Hieracium Scouleri Hook., Oregon, Washington.
Hieracium umbellatum L., North Dakota, South Dakota.
Hieracium sp., Mexico (state); Guatemala.
Hypochaeris glabra L., California.
Hypochaeris radicata L., California, Oregon.
Leontodon dumetorum (Greene) Rydb. (*Taraxacum dumetorum* Greene), Colorado.
Leontodon erythrospermum (Andrz.) Eichw. (*Taraxacum erythrospermum* Andrz.), Indiana, Maine, Nebraska, North Dakota, Ohio.
Leontodon Taraxacum L. (*Taraxacum officinale* Weber, *T. Dens-leonis* Desf., *T. Taraxacum* Karst.), Alaska, California, Colorado, Delaware, Florida, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, Utah, Virginia, Washington, West Virginia, Wisconsin, Wyoming; British Columbia, Nova Scotia, Ontario, Quebec, Saskatchewan.
Nothocalais cuspidata (Pursh) Greene (*Troximon cuspidatum* Pursh), Colorado, Iowa, Nebraska.
Ptilocalais graciloba (Kellogg) Greene (*Microseris major laciniata* A. Gray), Utah.
Ptilocalais macrolepis Rydb., Utah.
Ptilocalais major (A. Gray) Greene (*Microseris major* A. Gray), Utah.
Ptilocalais nutans (Geyer) Greene (*Microseris nutans* A. Gray), California, Idaho.
Ptilocalais tenuifolia Osterhout, Utah.
Sitilias caroliniana (Walt.) Raf. (*Pyrrhopappus carolinianus* DC.), Arkansas, Florida, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas.
Sitilias grandiflora (Nutt.) Greene (*Pyrrhopappus scaposus* DC.), Arizona, Kansas, Oklahoma, Texas.
Sitilias multicaulis (DC.) Greene (*Pyrrhopappus multicaulis* DC.), Texas.
Uropappus Lindleyi (DC.) Nutt. (*Microseris Lindleyi* DC.), California.

TYPE LOCALITY: Island of Zealand, Denmark, on *Hieracium sylvaticum*.

DISTRIBUTION: United States and southern Canada, southward into Guatemala; also throughout the temperate and subtropical zones of the world.

ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**[2]: *f. 178, 179, 181, 182;* Krypt.-fl. Brand. Pilze **3**: *f. B72, B75, B76a, B80, B81;* Ann. Rep. N. Y. State Mus. **25**: *pl. 2, f. 6;* Fl. Ital. Crypt. Ured. *f. 56;* Grove, Brit. Rust Fungi *f. 100–102, 106*.

EXSICCATI: Barth. Fungi Columb. *2778, 2968, 3064, 3167, 3178, 3269, 3270, 3356, 3373, 3468, 3770, 3771, 3933, 3944, 3972, 4164, 4372;* Barth. N. Am. Ured. *34, 242, 371, 468, 470, 472, 540, 565, 575, 664, 667, 768, 850, 868, 869, 1253, 1273, 1351, 1375, 1452, 1473, 1669, 1778, 1840, 1851, 1874, 1970, 2073, 2169, 2234, 2251, 2270, 2369, 2429, 2449;* Brenckle, Fungi Dak. *68, 463;* Carleton, Ured. Am. *24;* Clements, Crypt. Form. Colo. *145, 147, 580;* Ellis N. Am. Fungi *1452;* Ellis & Ev. Fungi Columb. *262, 351, 352, 755, 764, 1464, 1648, 1959;* Ellis & Ev. N. Am. Fungi *2252b;* Garrett, Fungi Utah. *20, 46, 70, 85, 115, 133, 157, 171, 236;* D. Griff. W. Am. Fungi *238, 238a;* Kellerm. Ohio Fungi *73, 74;* Seym. & Earle, Econ. Fungi *324a, b, c, 516;* Shear, N. Y. Fungi *320;* Syd. Ured. *1268, 1914, 1915, 1945, 2043, 2332*.

66. **Bullaria (?) Pinaropappi** (Sydow) Arthur & Mains.

Puccinia Pinaropappi Sydow, Hedwigia Beibl. **40**: 127. 1901.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or in small groups 2–3 mm. across, oval or oblong, 0.1–0.6 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores broadly ellipsoid or globoid, 18–21 by 21–27 μ; wall cinnamon-brown, thick, 3 μ, sometimes thickened up to 4.5 μ at base, finely and closely echinulate, the pores 2, equatorial.

III. Telia amphigenous, or caulicolous, scattered, oval or oblong, 0.3–0.6 mm. in length, early naked, compact becoming slightly pulverulent, blackish and shining, ruptured epidermis evident; teliospores broadly ellipsoid, 23–26 by 29–35 μ, rounded above and below, not constricted at septum; wall dark chestnut- or chocolate-brown, uniform in thickness, 3 μ, rather closely, finely, and inconspicuously verrucose, appearing smooth, the pore of the upper cell somewhat variable, usually in the lower half of the cell, often at septum, the pore of the lower cell usually in the upper half of the cell; pedicel colorless, 10 μ wide, up to 40 μ long, fragile, sometimes laterally attached.

ON CICHORIACEAE:
Pinaropappus roseus Less., Texas.

TYPE LOCALITY: Austin, Texas, on *Pinaropappus roseus*.

DISTRIBUTION: Known only from the type locality.

EXSICCATI: Barth. Fungi Columb. *2460*.

36. *TELEUTOSPORA Arth. & Bisby; Arth. Bull. Torrey Club 48: 38. 1921.

Telospora Arth. Résult. Sci. Congr. Bot. Vienne 346, in part. 1906.
Haplotelium Sydow, Ann. Myc. 20: 124. 1922.

Cycle of development includes pycnia (sometimes obsolete) and telia, both subepidermal.

Pycnia immersed in the tissues of the host, globoid or flask-shaped, with protruding ostiolar filaments.

Telia erumpent, definite, on a limited or definite mycelium. Teliospores free, pedicelled, one-celled, sometimes germinating in the sorus at maturity; wall colored, smooth or verrucose, with one apical pore.

Type species, *Uromyces Rudbeckiae* (on *Rudbeckia laciniata*).

Inhabiting monocotyledonous hosts.	
Host belonging to family Liliaceae.	1. *T. heteroderma.*
Inhabiting dicotyledonous hosts.	
Host belonging to family Caesalpiniaceae.	
Teliospore-wall less than 3 μ thick.	2. *T. jamaicensis.*
Teliospore-wall 3 μ thick, or more.	3. *T. bauhiniicola.*
Host belonging to family Fabaceae.	4. *T. abbreviata.*
Host belonging to family Euphorbiaceae.	5. *T. Tranzschelii.*
Host belonging to family Myrsinaceae.	6. *T. Myrsines.*
Host belonging to family Primulaceae.	7. *T. nevadensis.*
Host belonging to family Carduaceae.	
Teliospore-wall chestnut-brown, 2–3 μ thick.	8. *T. Solidaginis.*
Teliospore-wall cinnamon-brown, 1.5–2.5 μ thick.	9. *T. amoena.*
Teliospore-wall pale-brownish, 1 μ thick.	
Teliospores less than 30 μ long.	10. *T. Rudbeckiae.*
Teliospores more than 30 μ long.	11. *T. Bidentis.*

1. Teleutospora heteroderma (Sydow) Arthur & Bisby.

Uromyces heterodermus Sydow, Ann. Myc. 4: 29. 1906.

O. Pycnia amphigenous, not uncommon, gregarious in loose groups with the telia, 0.5–1.5 mm. across, inconspicuous, dark golden-brown, flattened-globoid, 100–185 μ broad, 65–130 μ high; ostiolar filaments few, loose, up to 65 μ long.

III. Telia amphigenous, numerous, scattered or in small groups, sometimes upon pale spots, roundish or oval, 0.3–2 mm. across, rather early naked, pulverulent, dark cinnamon-brown, surrounding epidermis noticeable; teliospores ellipsoid or broadly ellipsoid, 19–26 by 26–43 μ, rounded above, rounded or slightly narrowed below; wall dark golden-brown, 1.5 μ thick, thicker at apex with a distinct hyaline papilla, 3–6 μ, coarsely verrucose above, with the markings often in longitudinal ridges, smoother below; pedicel hyaline, fragile, short.

On Liliaceae:
Erythronium grandiflorum Pursh, Montana, Utah, Washington; British Columbia.
Erythronium montanum S. Wats., Washington.
Erythronium obtusatum Goodding, Wyoming.
Erythronium parviflorum (S. Wats.) Goodding (*E. grandiflorum parviflorum* S. Wats.), Colorado, Montana, Oregon, Utah, Wyoming.

Type locality: Wasatch Mountains, Utah, on *Erythronium parviflorum.*

Distribution: Rocky Mountain region from Colorado and Utah northward, and to the coast in Oregon.

Exsiccati: Barth. Fungi Columb. *4694;* Barth. N. Am. Ured. *789, 1592, 1692;* Ellis & Ev. Fungi Columb. *750;* Garrett, Fungi Utah. *118.*

2. Teleutospora jamaicensis (Vesterg.) Arthur & Bisby.

Uromyces jamaicensis Vesterg. Ark. Bot. 4[15]: 33. 1905.

O. Pycnia chiefly epiphyllous, gregarious in small groups with the telia, brownish, flattened-globoid, 65–100 μ broad, 45–70 μ high; ostiolar filaments compact, hardly extending beyond the ostiole.

III. Telia amphigenous, numerous, gregarious in small groups or occurring singly, sometimes on small yellowish spots, roundish, small, 0.1–1 mm. across, early naked, pulverulent, chestnut-brown, surrounding epidermis noticeable; teliospores globoid, broadly ellipsoid or obovoid, 12–17 by 16–23 μ, rounded or slightly narrowed at both ends; wall cinnamon-brown, 1.5–2 μ, sometimes up to 3 μ, thick, thicker at apex, up to 4 μ, with a lighter crater or cap-

**Teleutospora* in collaboration with Guy Richard Bisby.

shaped crown, closely and finely reticulate, appearing verrucose under the lower powers of the microscope; pedicel pale, fragile, 4–15 μ long.

ON CAESALPINIACEAE:
Bauhinia divaricata L., Guanajuato; Cuba.
Bauhinia Pauletia Pers., Porto Rico.
Bauhinia sp., Jamaica.
TYPE LOCALITY: Constant Spring, Jamaica, on *Bauhinia* sp.
DISTRIBUTION: South-central Mexico and the West Indies; also in South America.
ILLUSTRATION: Ark. Bot. 4[15]: *pl. 2, f. 14.*

3. Teleutospora bauhiniicola (Arth.) Arth. & Bisby; Arth. Bull. Torrey Club 48: 39. 1921.

Uromyces bauhiniicola Arth. Bot. Gaz. 39: 389. 1905.
Telospora bauhiniicola Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia epiphyllous, few, gregarious in small groups, usually opposite the telia, punctiform, brownish, depressed-globoid, 60–130 μ in diameter, 30–65 μ high; ostiolar filaments compact, short.

III. Telia at first hypophyllous, becoming also somewhat epiphyllous, numerous, scattered or in small groups, roundish, small, 0.2–1 mm. across, early naked, pulverulent, chocolate-brown, surrounding epidermis inconspicuous; teliospores globoid or broadly ellipsoid, 14–21 by 18–26 μ, rounded at both ends; wall cinnamon- or chestnut-brown, thick, 3–4 μ, thicker at apex, 4–7 μ, with a broad lighter-colored umbo, finely reticulate; pedicel pale or colorless, often roughened below, rather fragile, but often two or three times as long as the spore.

ON CAESALPINIACEAE:
Bauhinia Pringlei S. Wats., Jalisco.
Bauhinia sp., Guerrero.
TYPE LOCALITY: Guadalajara, Mexico, on *Bauhinia Pringlei.*
DISTRIBUTION: South-west central Mexico.
ILLUSTRATION: Ark. Bot. 4[15]: *pl. 1, f. 9.*
EXSICCATI: Barth. N. Am. Ured. *286.*

4. Teleutospora abbreviata (Arth.) Arthur & Bisby.

Uromyces abbreviatus Arth. Bull. Torrey Club 42: 587. 1915.

O. Pycnia hypophyllous, scattered among the telia, inconspicuous, deep-seated, dark honey-yellow, globose or flattened-globose, 115–200 μ in diameter, 95–140 μ high; ostiolar filaments dense, often falling away, up to 60 μ in length.

III. Telia hypophyllous, rarely also epiphyllous, scattered over large areas, often densely clustered, roundish, 0.2–0.7 mm. across, early naked, pulverulent, chocolate-brown, surrounding epidermis at first evident, later often hidden by the loose spores; teliospores ellipsoid or irregularly obovoid, 21–26 by 27–40 μ (sometimes variable in size, and larger), rounded above, rounded or narrowed below; wall chestnut-brown, 2–3 μ thick, 3–5 μ thick at apex, with a slight umbo over the pore, smooth; pedicel colorless, delicate, fugacious, half as long as spore or less.

This species is correlated with *Pucciniola Psoraleae* (Peck) Arth., the telia being morphologically indistinguishable from those of that species. The two forms when more fully studied might possibly be united under one name.

ON FABACEAE:
Hoita physodes (Dougl.) Rydb. (*Psoralea physodes* Dougl.), California, Washington; British Columbia.
Psoralidium Purshii (Vail) Rydb. (*Psoralea Purshii* Vail), Nevada.
TYPE LOCALITY: Winnemucca, Nevada, on *Psoralea Purshii.*
DISTRIBUTION: British Columbia to northern Nevada and central California.
EXSICCATI: Barth. Fungi Columb. *4884;* Barth. N. Am. Ured. *1582;* D. Griff. W. Am. Fungi *390.*

5. Teleutospora Tranzschelii (Sydow) Arthur & Bisby.

Uromyces Tranzschelii Sydow; Tranz. Ann. Myc. 8: 20. 1910.

O. Pycnia hypophyllous, scattered among the telia, or in groups, noticeable, dark-yellow, globoid or flask-shaped, 100–145 μ broad by 75–130 μ high; ostiolar filaments dense, agglutinate into a truncate column, 50–80 μ in height, 50–70 μ in diameter at the ostiole.

III. Telia hypophyllous, occasionally sparingly epiphyllous, numerous, evenly scattered over large areas, or sometimes in groups around the pycnia, roundish, 0.2–0.6 mm. across, early naked by a central pore, pulverulent, chestnut-brown, surrounding epidermis crateriform, conspicuous; teliospores globoid or ellipsoid, 15–22 by 19–30 μ, rounded at both ends; wall cinnamon-brown, 1–2 μ thick, with a low, subhyaline umbo over the apical pore, finely verrucose, the markings often in irregular-longitudinal lines; pedicel colorless, deciduous.

This species is correlated with *Pucciniola coördinata* Arth., a long-cycled, autoecious species, but without uredinia, and with *Nigredo occidentalis* (Dietel) Arth., a long-cycled, heteroecious species. The morphological characters of corresponding stages in the three species are nearly or quite identical, and together with the correspondence in hosts doubtless indicate a common origin.

ON EUPHORBIACEAE:
Chamaesyce serpens (H.B.K.) Small (*Euphorbia serpens* H.B.K.), California.
Tithymalus chamaesula (Boiss.) Wooton & Standley (*Euphorbia chamaesula* Boiss.), New Mexico.
Tithymalus montanus (Engelm.) Small (*Euphorbia montana* Engelm.), Colorado, Utah, Wyoming.
Tithymalus Palmeri (Engelm.) Arth. (*Euphorbia Palmeri* Engelm.), California; Lower California.
Tithymalus robustus (Engelm.) Small (*Euphorbia montana robusta* Engelm.), Arizona, Colorado, Montana, Utah, Wyoming.
TYPE LOCALITY: Colorado, on *Euphorbia montana*.
DISTRIBUTION: From Wyoming to New Mexico, southern California, and Lower California.
EXSICCATI: Barth. N. Am. Ured. *499, 1899, 2500;* Ellis & Ev. Fungi Columb. *1069;* Ellis & Ev. N. Am. Fungi *2230;* Garrett, Fungi Utah. *97.*

6. **Teleutospora Myrsines** (Dietel) Arthur & Bisby.

Uromyces Myrsines Dietel, Hedwigia **36**: 26. 1897.
Uromyces Usterianus Dietel, Ann. Myc. **6**: 96. My 1908.
Uromyces Rhapaneae P. Henn. Hedwigia **48**: 1. S 1908.
Haplotelium Myrsines Sydow, Ann. Myc. **20**: 124. 1922.

O. Pycnia unknown.

III. Telia hypophyllous, crowded upon reddish or blackish spots 2–5 mm. in diameter, round, 0.1–0.2 mm. in diameter, often confluent, early naked, pulvinate, light chocolate-brown, ruptured epidermis inconspicuous; teliospores oblong or oblong-ellipsoid, 13–16 by 27–39 μ, rounded or acute above, narrowed below; wall pale golden-brown, rather thin, 1–2 μ, thickened at apex, 4–8 μ, smooth; pedicel colorless, short.

ON MYRSINACEAE:
Ardisia compressa H.B.K., Costa Rica.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Myrsine* sp.
DISTRIBUTION: Costa Rica; also in South America.

7. **Teleutospora nevadensis** (Hark.) Arthur & Bisby.

Uromyces nevadensis Hark. Bull. Calif. Acad. **1**: 36. 1884.
Caeomurus nevadensis Kuntze, Rev. Gen. **3**^{3}: 450. 1898.

O. Pycnia unknown.

III. Telia amphigenous, circinating in groups 2–5 mm. across or somewhat scattered, round or oval, 0.2–1 mm. across, early naked, pulvinate, becoming somewhat pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores oblong, oblong-obovoid, or ellipsoid, 19–27 by 29–47 μ, rounded at apex, rounded or narrowed toward base; wall cinnamon-brown, lighter or colorless at apex, moderately thick, 1.5–2.5 μ, thickened at apex, 5–7 μ, moderately and rather finely verrucose; pedicel colorless, fragile.

ON PRIMULACEAE:
Primula suffrutescens A. Gray, California, Nevada.
TYPE LOCALITY: Lake Tahoe, Nevada, on *Primula suffrutescens*.
DISTRIBUTION: Mountainous region of central California, and adjacent Nevada.

8. **Teleutospora Solidaginis** (Sommerf.) Arth. & Bisby; Arth. Bull. Torrey Club **48**: 39. 1921.

Caeoma Solidaginis Sommerf. Suppl. Fl. Lapp. 234. 1826.
Uromyces Solidaginis Niessl, Verh. Nat.-Ver. Brünn **10**: 163. 1872.
Caeomurus Solidaginis Kuntze, Rev. Gen. **3**^{3}: 450. 1898.
Telospora Solidaginis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Haplotelium Solidaginis Sydow, Ann. Myc. **20**: 124. 1922.

O. Pycnia not found; probably wanting.

III. Telia hypophyllous, sometimes also petiolicolous or caulicolous, crowded and often confluent in orbicular groups upon the leaves, or elongate groups upon the petioles or stems, 2–10 mm. across, upon yellowish spots, roundish, small, 0.3–0.7 mm. across, early naked, compact, pulvinate, chocolate-brown, surrounding epidermis noticeable; teliospores obovate or ellipsoid, 17–25 by 24–33 μ, narrowed or rounded at both ends; wall chestnut-brown, 2–3 μ thick, much thicker at apex, 6–12 μ, smooth; pedicel nearly colorless, about as long as spore.

ON CARDUACEAE:

Solidago elongata Nutt., Wyoming.
Solidago pulcherrima A. Nelson (*S. nemoralis* Auct.), Colorado.
Solidago serotina Ait., Idaho, Montana, Washington, Wyoming.
Solidago sp., Oregon.

TYPE LOCALITY: Norrland, Sweden, on *Solidago virgaurea*.
DISTRIBUTION: Colorado and Montana westward to Oregon and Washington; also in Europe and Asia.
ILLUSTRATIONS: Arch. Nat. Land. Böhmen **13**: *f. 12;* Beitr. Krypt. Schweiz **2**[2]: *f. 44;* Sitz.-ber. Boehm. Ges. Wiss. **1902**[46]: *f. 19–24.*
EXSICCATI: Ellis & Ev. N. Am. Fungi *2883;* D. Griff. W. Am. Fungi *361.*

9. **Teleutospora amoena** (Sydow) Arthur & Bisby.

Uromyces amoenus Sydow, Ann. Myc. **4**: 28. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, densely grouped and often confluent on circular, purplish spots 2–8 mm. across, the margin of the spots yellow, roundish, small, 0.2–0.7 mm. across, early naked, compact, pulvinate, dark chestnut-brown, covered by the tomentose pubescence of the host, ruptured epidermis inconspicuous; teliospores globoid, obovoid, or ellipsoid, 16–23 by 22–30 μ, usually rounded above and narrowed below; wall dark golden- or cinnamon-brown, moderately thick, 1.5–2.5 μ, thicker at apex, 4–7 μ, smooth; pedicel pale-yellowish, up to the length of spore.

ON CARDUACEAE:

Anaphalis margaritacea occidentalis Greene, Oregon.
Anaphalis subalpina (A. Gray) Rydb. (*A. margaritacea subalpina* A. Gray), Idaho, Oregon, Washington, Wyoming; British Columbia.

TYPE LOCALITY: Washington, on *Gnaphalium* (*Anaphalis*) *margaritacea*.
DISTRIBUTION: Wyoming to British Columbia and Oregon.
EXSICCATI: Barth. N. Am. Ured. *1385, 1584;* Ellis & Ev. Fungi Columb. *1795.*

10. **Teleutospora Rudbeckiae** (Arth. & Holway) Arth. & Bisby; Arth. Bull. Torrey Club **48**: 39. 1921.

Uromyces Rudbeckiae Arth. & Holway; Arth. Bull. Iowa Agr. Coll. **1884**: 154. 1885.
Caeomurus Rudbeckiae Kuntze, Rev. Gen. **3**[3]: 450. 1898.
Telospora Rudbeckiae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, occasionally also epiphyllous, densely gregarious upon brownish spots, paler below, 1–10 mm. across, rather circinate, small, 0.2–0.8 mm. in diameter, early naked, compact, pulvinate, cinnamon-brown, soon cinereous from germination, surrounding epidermis not noticeable; teliospores ellipsoid, obovoid, or pyriform, 11–17 by 19–30 μ, rounded, acute or obtuse above, narrowed below; wall yellowish or very pale chestnut-brown, thin, 1 μ, thicker at apex, 5–7 μ, smooth; pedicel hyaline, twice as long as spore or less.

ON CARDUACEAE:

Rudbeckia laciniata L., Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Montana, Nebraska, New Mexico, North Dakota, Pennsylvania, Wisconsin, Wyoming; Ontario.
Rudbeckia sp., Texas.

TYPE LOCALITY: Decorah, Iowa, on *Rudbeckia laciniata*.
DISTRIBUTION: Ontario and Pennsylvania to Montana and southeastern Texas.
ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 1.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *1;* Barth. Fungi Columb. *4394;* Barth. N. Am. Ured. *299, 1099, 1397;* Brenckle, Fungi Dak. *274;* Ellis & Ev. Fungi Columb. *2097;* Ellis, N. Am. Fungi *1439;* Rab.-Wint. Fungi Eur. *3412;* Sydow, Ured. *1305, 1962.*

11. **Teleutospora Bidentis** (Lagerh.) Arthur & Bisby.

Uromyces Bidentis Lagerh. Bull. Soc. Myc. Fr. **11**: 213. 1895.
Caeomurus Bidentis Kuntze, Rev. Gen. **3**[3]: 449. 1898.
Uromyces densus Arth. Mycologia **7**: 196. 1915.

O. Pycnia unknown.

III. Telia hypophyllous, numerous, in small circinating groups on roundish, discolored spots 1–4 mm. across, sometimes confluent, roundish or oval, 0.1–1 mm. across, the central sorus largest, surrounded by the smaller ones, early naked, compact, pulvinate, dull cinnamon-brown, becoming waxy-cinereous from germination, surrounding epidermis inconspicuous; teliospores obovoid or oblong, 15–23 by 30–45 μ, rounded or narrowed above, narrowed below; wall pale cinnamon-brown, thin, 1 μ, thicker above, 4–9 μ, smooth; pedicel hyaline, once or twice length of spore.

This species is correlated with *Klebahnia Bidentis* (P. Henn.) Arth., the pycnia and telia being morphologically indistinguishable from that species. Sometimes the two forms occur intermixed upon the same leaf, and seemingly arise from the same mycelium. When more fully studied it may be found advisable to unite them under one name.

ON CARDUACEAE:

Bidens leucantha (L.) Willd., Porto Rico.
Bidens pilosa L., Haïti; Porto Rico.
Bidens squarrosa H.B.K. (*B. antiguensis* Coult., *B. tereticaulis* DC.), Costa Rica.

TYPE LOCALITY: Ecuador, on *Bidens andicola*.
DISTRIBUTION: West Indies and Central America; also in South America.

37. *MICROPUCCINIA Rostr. Plantep. Haandb. 266. 1902.

Puccinia Link, Ges. Nat. Freunde Berlin Mag. **7**: 29. 1815. Not *Puccinia* Willd. 1787, nor *Puccinia* Pers. 1794.
Caeoma § *Dicaeoma* Nees, Syst. Pilze 16. 1816.
Leptopuccinia Rostr. Plantep. Haandb. 268. 1902.
Dasyspora Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906. Not *Dasyspora* Berk. & Curt. 1853.
Polioma Arth. Jour. Myc. **13**: 29. 1907.
Sclerotelium Sydow, Ann. Myc. **19**: 172. 1921.
Coronotelium Sydow, Ann. Myc. **19**: 172. 1921.
Trailia Sydow, Ann. Myc. **20**: 121. 1922.

Cycle of development includes pycnia (frequently obsolete) and telia, both subepidermal or the pycnia rarely subcuticular.

Pycnia submerged in the tissues of the host beneath the epidermis, globoid or flask-shaped, with protruding ostiolar filaments (or when subcuticular, superficial and conic, without ostiolar filaments).

Telia erumpent, or occasionally long covered by the epidermis, definite, often in circinating groups, compact, sometimes confluent into a cumulative mass, frequently cinereous by germination of the spores at their maturity, especially when unaccompanied by pycnia, or pulverulent. Teliospores free, pedicelled, two-celled, in some species also few or many one-celled (mesospores); wall colored, in a few species nearly or quite colorless, firm, smooth or less often verrucose, with one pore in each cell, usually in the upper part.

Type species, *Micropuccinia Ribis* (DC.) Rostr. on *Ribes rubrum*.

Host belonging to family Liliaceae.	
Teliospore-wall conspicuously and irregularly tuberculate.	1. *M. tumamocensis*.
Teliospore-wall finely and inconspicuously striate.	2. *M. Moreniana*.
Host belonging to family Convallariaceae.	3. *M. mesomajalis*.
Host belonging to family Aristolochiaceae.	4. *M. asarina*.
Host belonging to family Polygonaceae.	5. *M. ornata*.
Host belonging to family Chenopodiaceae.	6. *M. Eurotiae*.
Host belonging to family Portulacaceae.	7. *M. agnita*.
Host belonging to family Caryophyllaceae.	
Teliospore-wall nearly or quite uniformly thin.	8. *M. detonsa*.
Teliospore-wall much thickened above.	
Telia round or oval.	9. *M. Arenariae*.
Telia long and linear.	10. *M. hysteriiformis*.
Host belonging to family Ranunculaceae.	
Telia long covered by epidermis.	11. *M. Pulsatillae*.
Telia soon naked.	
Teliospores clavate or fusiform, smooth.	
Teliospores narrow, 12–16 μ.	12. *M. Anemones-virginianae*.
Teliospores broad, 20–26 μ.	13. *M. gemella*.

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Teliospores ellipsoid.
Teliospore-wall minutely verrucose, seemingly smooth.
Teliospore-wall with umbo at apex. 14. *M. Treleasiana.*
Teliospore-wall uniformly thin.
Teliospores small, up to 32 μ long; mesospores absent. 15. *M. Delphinii.*
Teliospores larger, up to 35 μ long; mesospores present. 16. *M. andina.*
Teliospore-wall coarsely verrucose. 17. *M. Ranunculi.*
Host belonging to family Berberidaceae. 18. *M. Berberidis-trifoliae.*
Host belonging to family Fumariaceae. 19. *M. Brandegei.*
Host belonging to family Brassicaceae.
Telia tardily naked, finally becoming pulverulent.
Teliospores narrowly oblong. 20. *M. Dentariae.*
Teliospores ellipsoid.
Teliospores with apical umbo. 21. *M. Drabae.*
Teliospores with inconspicuous or no umbo. 22. *M. utahensis.*
Telia early naked, pulvinate.
Teliospores oblong, the pedicels persistent.
Teliospore-wall thin, 1–1.5 μ. 23. *M. Thlaspeos.*
Teliospore-wall thicker, 1.5–2 μ. 24. *M. Holboellii.*
Teliospores usually ellipsoid, the pedicels deciduous.
Teliospore-wall thin, 1–2 μ. 25. *M. Cruciferarum.*
Teliospore-wall thicker, 2–3.5 μ. 26. *M. aberrans.*
Host belonging to family Crassulaceae.
Teliospore-wall finely verrucose. 27. *M. Rydbergii.*
Teliospore-wall nearly or quite smooth. 28. *M. Rhodiolae.*
Host belonging to family Saxifragaceae.
Teliospore-wall smooth; teliospores oblong-fusiform.
Teliospores large, 18–20 × 40–50 μ. 29. *M. laurentiana.*
Teliospores smaller, 13–16 × 26–38 μ. 30. *M. pallido-maculata.*
Teliospore-wall smooth with occasional striae; teliospores mostly oblong. 31. *M. Heucherae.*
Teliospore-wall striate; teliospores mostly ellipsoid.
Teliospore-wall finely striate. 32. *M. curtipes.*
Teliospore-wall coarsely striate. 33. *M. Lithophragmae.*
Teliospore-wall verrucose; teliospores mostly ellipsoid or oblong.
Teliospore-wall coarsely verrucose.
Teliospore-wall thickened up to 5 μ above. 34. *M. Heterisiae.*
Teliospore-wall thickened up to 7 μ above. 35. *M. turrita.*
Teliospore-wall minutely verrucose, appearing smooth.
Teliospores 19–23 μ broad. 36. *M. Saxifragae-tricuspidatae.*
Teliospores 15–18 μ broad. 37. *M. Jueliana.*
Host belonging to family Parnassiaceae. 38. *M. Parnassiae.*
Host belonging to family Grossulariaceae.
Teliospores verrucose. 39. *M. Ribis.*
Teliospores smooth. 40. *M. Parkerae.*
Host belonging to family Rosaceae.
Teliospores ellipsoid; teliospore-wall rugose. 41. *M. Sieversiae.*
Teliospores cylindric; teliospore-wall smooth. 42. *M. Waldsteiniae.*
Host belonging to family Geraniaceae. 43. *M. Leveillei.*
Host belonging to family Polygalaceae. 44. *M. Pyrolae.*
Host belonging to family Sapindaceae. 45. *M. Arechavaletae.*
Host belonging to family Rhamnaceae. 46. *M. Mesnieriana.*
Host belonging to family Tiliaceae. 47. *M. Triumfettae.*
Host belonging to family Malvaceae.
Teliospores large, 38–75 μ.
Telia usually light-brown, scattered. 48. *M. Malvacearum.*
Telia usually dark-brown, gregarious.
Teliospores up to 75 μ long; wall moderately thick, 1.5–4 μ. 49. *M. Sherardiana.*
Teliospores up to 48 μ long; wall very thick, 3–5 μ. 50. *M. Sidalceae.*
Teliospores small, 18–45 μ.
Telia usually dark-brown.
Mesospores predominating. 51. *M. heterospora.*
Mesospores rare or wanting. 52. *M. lobata.*
Telia usually light-brown.
Teliospore-wall thick, 2–3 μ, much thicker above. 53. *M. Anodae.*
Teliospore-wall thin, 1–2 μ, scarcely thicker above. 54. *M. exilis.*
Host belonging to family Sterculiaceae. 55. *M. filopes.*
Host belonging to family Dilleniaceae. 56. *M. hiascens.*
Host belonging to family Violaceae.
Teliospore-wall smooth. 57. *M. Fergussoni.*
Teliospore-wall striate.
Teliospores ellipsoid or oblong, striae few. 58. *M. ornatula.*
Teliospores narrowly oblong, striae numerous. 59. *M. canadensis.*
Host belonging to family Lythraceae. 60. *M. Cupheae.*
Host belonging to family Onagraceae.

Teliospore-wall smooth.
Teliospores oblong.
Teliospores small, 24–39 μ long. 61. *M. Circaeae.*
Teliospores large, 34–45 μ long. 62. *M. Fuchsiae.*
Teliospores cylindric, 32–58 μ long. 63. *M. gigantea.*
Teliospore-wall minutely verrucose.
Teliospores moderately large, 30–42 μ long. 64. *M. Epilobii.*
Teliospores smaller, 27–38 μ long. 65. *M. scandica.*
Host belonging to family Araliaceae. 66. *M. Araliae.*
Host belonging to family Ammiaceae.
Teliospores oblong; telia tardily naked. 67. *M. Cryptotaeniae.*
Teliospores ellipsoid.
Teliospores verrucose; telia tardily naked. 68. *M. Musenii.*
Teliospores smooth; telia early naked.
Teliospore-pores with prominent umbo. 69. *M. poromera.*
Teliospore-pores with small umbo or none. 70. *M. Ligustici.*
Host belonging to family Cornaceae. 71. *M. porphyrogenita.*
Host belonging to family Primulaceae. 72. *M. Dayi.*
Host belonging to family Santalaceae. 73. *M. Comandrae.*
Host belonging to family Gentianaceae. 74. *M. Haleniae.*
Host belonging to family Asclepiadaceae.
Teliospores oblong. 75. *M. concrescens.*
Teliospores globoid or broadly obovate. 76. *M. obliqua.*
Host belonging to family Dichondraceae. 77. *M. Dichondrae.*
Host belonging to family Polemoniaceae.
Teliospores oblong or cylindric, up to 42 μ long. 78. *M. Polemonii.*
Teliospores ellipsoid or oblong, up to 35 μ long. 79. *M. gulosa.*
ost belonging to family Hydrophyllaceae.
Teliospore-wall roughened.
Teliospore-wall finely verrucose. 80. *M. Hydrophylli.*
Teliospore-wall sparsely tuberculate. 81. *M. Romanzoffiae.*
Teliospore-wall smooth.
Teliospores clavate, truncate above. 82. *M. Phaceliae.*
Teliospores obovate, obtuse above. 83. *M. Heliotropii.*
Host belonging to family Boraginaceae. 84. *M. Mertensiae.*
Host belonging to family Verbenaceae.
Pedicel moderately inflated.
Mesospores none or rare. 85. *M. Urbaniana.*
Mesospores usually predominant. 86. *M. Lantanae.*
Pedicel greatly inflated. 87. *M. permagna.*
Host belonging to family Lamiaceae:
Teliospore-wall colored.
Teliospores verrucose.
Teliospore-wall uniformly thick. 88. *M. distorta.*
Teliospore-wall thicker above in some spores. 89. *M. Physostegiae.*
Teliospores smooth.
Teliospores rounded at ends; teliospore-wall with small umbo over pore. 90. *M. Schneideri.*
Teliospores narrowed at ends; teliospore-wall much thicker above. 91. *M. Hyssopi.*
Teliospore-wall colorless or nearly so.
Teliospore-wall considerably thickened above, 2–5 μ. 92. *M. pallidissima.*
Teliospore-wall not or slightly thickened above.
Teliospores oblong, 27–48 μ long. 93. *M. delicatula.*
Teliospores cylindric, 48–61 μ long. 94. *M. nivea.*
Host belonging to family Solanaceae.
Teliospores evenly scattered over lower leaf-surface. 95. *M. Physalidis.*
Telia in compact, localized groups.
Teliospores clavate, lower cell longer than upper. 96. *M. solanitum.*
Teliospores ellipsoid, rarely clavate, cells equal.
Teliospores averaging more than 32 μ long. 97. *M. Sarachae.*
Teliospores averaging less than 32 μ long.
Teliospores 23–28 μ long. 98. *M. incondita.*
Teliospores 26–34 μ long. 99. *M. Pittieriana.*
Host belonging to family Scrophulariaceae.
Teliospores finely verrucose.
Teliospore-wall uniformly thick. 100. *M. acrophila.*
Teliospore-wall thicker above.
Teliospore-wall striately verrucose. 101. *M. Clintonii.*
Teliospore-wall evenly verrucose. 102. *M. rhaetica.*
Teliospores smooth or apparently so.
Teliospore-wall uniformly thick. 103. *M. Chelonis.*
Teliospore-wall thicker above.
Teliospore-wall 1.5 μ or more thick at sides.
Teliospores broad, 18–23 μ. 104. *M. Pentstemonis.*
Teliospores narrow, 14–20 μ.
Teliospore-wall dark cinnamon-brown. 105. *M. Seymeriae.*
Teliospore-wall golden- or light cinnamon-brown.
Teliospores rounded above. 106. *M. nesodes.*
Teliospores obtuse above. 107. *M. Veronicarum.*

Teliospore-wall less than 1.5 μ thick at sides.
Teliospores not or slightly constricted at septum. 108. *M. albulescens.*
Teliospores strongly constricted at septum. 109. *M. Wulfeniae.*
Host belonging to family Bignoniaceae. 110. *M. depallens.*
Host belonging to family Acanthaceae. 111. *M. Elytrariae.*
Host belonging to family Rubiaceae.
Teliospores clavate. 112. *M. rubefaciens.*
Teliospores ellipsoid or obovate. 113. *M. lateritia.*
Host belonging to family Caprifoliaceae.
Teliospores rough. 114. *M. Linkii.*
Teliospores smooth.
Teliospore-wall dark cinnamon-brown. 115. *M. Symphoricarpi.*
Teliospore-wall golden-brown. 116. *M. Apocyni.*
Host belonging to family Adoxaceae. 117. *M. Adoxae.*
Host belonging to family Campanulaceae. 118. *M. Campanulae.*
Host belonging to family Lobeliaceae. 119. *M. Lobeliae.*
Host belonging to family Ambrosiaceae. 120. *M. Xanthii.*
Host belonging to family Carduaceae.
Of the tribe Vernonieae.
Teliospores finely verrucose.
Teliospores not or slightly constricted. 121. *M. rotundata.*
Teliospores strongly constricted. 122. *M. discreta.*
Teliospores smooth. 123. *M. paupercula.*
Of the tribe Eupatorieae.
Teliospore-wall thickened above.
Pedicel fragile, colorless. 124. *M. tolimensis.*
Pedicel persistent, concolorous. 125. *M. praemorsa.*
Teliospore-wall uniform, very thin. 126. *M. Spegazzinii.*
Of the tribe Astereae.
Telia long covered by epidermis; stroma present. 127. *M. Virgaureae.*
Telia early naked; stroma wanting.
Teliospores usually narrowed below; pedicel short. 128. *M. Asteris.*
Teliospores usually rounded below; pedicel long.
Teliospores ellipsoid or obovate. 129. *M. Grindeliae.*
Teliospores cylindric or fusiform. 130. *M. Marianae.*
Of the tribe Heliantheae.
Teliospore-wall roughened.
Teliospore-wall uniformly thin, 1–2 μ.
Wall coarsely verrucose. 131. *M. Notopterae.*
Wall finely verrucose-rugose. 132. *M. ferox.*
Teliospore-wall thick, 2–2.5 μ, thicker above. 133. *M. absicca.*
Teliospore-wall smooth.
Teliospores averaging more than 50 μ long.
Teliospores oblong, 45–70 μ long.
Teliospore-wall thin above, 3–4 μ. 134. *M. Rudbeckiae.*
Teliospore-wall thick above, 6–12 μ 135. *M. ordinata.*
Teliospores clavate, 48–58 μ long. 136. *M. semota.*
Teliospores averaging less than 50 μ long.
Teliospores 10–16 μ broad; in temperate regions. 137. *M. Silphii.*
Teliospores 14–22 μ broad; in sub-tropical regions. 138. *M. Melampodii.*
Of the tribe Helenieae.
Teliospores usually narrowed below; wall cinnamon-brown, pedicel short. 139. *M. Flaveriae.*
Teliospores usually rounded below; wall chestnut-brown, pedicel long. 129. *M. Grindeliae.*
Of the tribe Anthemideae. 140. *M. Millefolii.*
Of the tribe Senecioneae.
Teliospores ellipsoid; pedicel deciduous.
Teliospores narrow, 14–18 μ; wall thin, 1 μ. 141. *M. conglomerata.*
Teliospores broad, 18–26 μ; wall thicker 1.5–2.5 μ. 142. *M. expansa.*
Teliospores obovate, oblong or clavate; pedicel persistent.
Telia brown, becoming cinereous by germination.
Teliospores very pale cinnamon-brown or colorless. 143. *M. Schistocarphae.*
Teliospores cinnamon- or chestnut-brown.
In sub-tropical regions. 144. *M. Emiliae.*
In temperate regions. 145. *M. recedens.*
Telia blackish. 129. *M. Grindeliae.*
Host belonging to family Cichoriaceae.
Teliospores verrucose. 146. *M. Suksdorfii.*
Teliospores smooth.
Sori evenly distributed over leaf-surface. 147. *M. Fraseri.*
Sori in groups.
Sori chocolate-brown or blackish.
Teliospores narrowed at both ends. 148. *M. columbiensis.*
Teliospores obtuse or rounded at both ends. 129. *M. Grindeliae.*
Sori cinnamon-brown, becoming cinereous. 149. *M. maculosa.*

1. **Micropuccinia tumamocensis** (Arth.) Arthur & Jackson.

Puccinia tumamocensis Arth. Bull. Torrey Club **42**: 589. 1915.

O. Pycnia hypophyllous, in small groups, surrounded by the telia, honey-yellow, globose, 130–190 μ in diameter, deep-seated; ostiolar filaments short, 30–40 μ long.

III. Telia hypophyllous, closely associated in elliptic groups 3–10 mm. long, surrounding the pycnia, often confluent, elliptic, 1–2 mm. long, becoming naked by the rupture of the epidermis which remains attached in shreds, pulverulent, blackish, prominent; teliospores broadly ellipsoid, 32–42 by 48–61 μ, rounded at both ends, slightly constricted at septum; wall 3–5 μ thick, dark chestnut- or blackish-brown, sparsely and very conspicuously and irregularly tuberculate, the pore of lower cell midway between pedicel and septum; pedicel colorless, fragile, short.

This species is correlated with *Dicaeoma nodosum* (Ellis & Hark.) Kuntze and *Allodus Carnegiana* (Arth.) Orton. The morphological characters of like stages in the three species are similar or identical and together with the correspondence in hosts doubtless indicate a common origin.

ON LILIACEAE:

Dipterostemon pauciflorus (Torr.) Rydb. (*Brodiaea capitata pauciflora* Torr., *B. pauciflora* Standley), Arizona.
TYPE LOCALITY: Tumamoc Hill, Tucson, Arizona, on *Brodiaea capitata pauciflora*.
DISTRIBUTION: Known only from the type locality.

2. **Micropuccinia Moreniana** (Dudley & Thompson) Arthur & Jackson.

Puccinia Moreniana Dudley & Thompson, Jour. Myc. **10**: 53. 1904.
Allodus Moreniana Orton, Mem. N. Y. Bot. Gard. **6**: 182. 1916.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, scattered or sometimes grouped, oval or oblong, 0.5–2 mm. wide by 1–5 mm. long, tardily naked, dark cinnamon-brown, slightly pulverulent, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 20–24 by 33–50 μ, the cells equal in size and shape, rounded at both ends, moderately constricted at septum; wall light cinnamon-brown, about 2 μ thick, uniform, finely and inconspicuously striate with longitudinal rows of minute papillae; pedicel colorless, delicate, about length of spore.

This species is correlated with *Dicaeoma Pattersonianum* (Arth.) Arth. & Fromme. The telia of the two species possess common morphological characters, while the host of this species is doubtless the same or closely related to the probable aecial host of *D. Pattersonianum*, the latter having been located with much certainty but not proven by cultures.

ON LILIACEAE:

Dipterostemon capitatus (Benth.) Rydb. (*Brodiaea capitata* Benth.), California.
TYPE LOCALITY: Searsville Lake [San Mateo county], California, on *Brodiaea capitata*.
DISTRIBUTION: Known only from the type locality.
ILLUSTRATIONS: Holway, N. Am. Ured. **1**: *pl. 8, f. 35;* Proc. Ind. Acad. Sci. **1921**: *pl. 1, f. B.*

3. **Micropuccinia mesomajalis** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia mesomajalis Berk. & Curt.; Peck, Ann. Rep. N. Y. State Mus. **25**: 111. 1873.
Puccinia mesomegala Berk. & Curt. Grevillea **3**: 52. 1874.
Dicaeoma mesomegalum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dasyspora mesomegala Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia amphigenous, crowded and circinating upon yellowsh spots 5–15 mm. across, round, minute, 0.1–0.5 mm. in diameter, somewhat tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores narrowly ellipsoid or oblong, 15–24 by 26–40 μ, rounded or somewhat narrowed above and below, slightly constricted at septum; wall golden- or cinnamon-brown, 1.5–2.5 μ thick, thickened over the pores into a small colorless papilla, 3–5 μ, very closely and finely verrucose, usually appearing smooth in water; pedicel colorless, fragile, short.

ON CONVALLARIACEAE:

Clintonia borealis (Ait.) Raf., Michigan, Minnesota, New Hampshire, New York, Wisconsin; Nova Scotia.
Clintonia uniflora (Menzies) Kunth, California, Idaho, Montana, Oregon, Washington; British Columbia.

TYPE LOCALITY: Adirondack mountains, New York, on *Clintonia borealis*.
DISTRIBUTION: Northern border of the United States, and adjacent Canada.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 9, f. 38.*
EXSICCATI: Barth. N. Am. Ured. *48, 460, 461, 1460;* Ellis, N. Am. Fungi *1041;* Ellis & Ev. Fungi Columb. *756;* Rel. Farl. *262;* Thüm. Myc. Univ. *1126;* Sydow, Ured. *324, 1776.*

4. **Micropuccinia asarina** (Kunze) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia asarina Kunze; Kunze & Schmidt, Myk. Hefte **1**: 70. 1817.
Puccinia Asari Link, in Willd. Sp. Pl. 6^2: 68. 1825.
Dicaeoma asarinum Kuntze, Rev. Gen. 3^3: 467. 1898.
Dasyspora asarina Arth. Résult. Sci. Congr. Bot. Vienne 346. 1896.

O. Pycnia unknown.

III. Telia amphigenous or petiolicolous, crowded upon more or less bladdery or swollen areas 3–5 mm. across, round, 0.3–0.8 mm. in diameter, somewhat tardily naked, deep-seated, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; teliospores oblong or fusiform-oblong, 16–21 by 30–40 μ, rounded or narrowed above and below, constricted at septum; wall golden-brown, 1–2 μ thick, thickened at apex into an abrupt colorless umbo over the pore, 4–7 μ, smooth; pedicel colorless, fragile.

ON ARISTOLOCHIACEAE:

Asarum caudatum Lindl., California, Idaho, Oregon, Washington.
Asarum Lemmoni S. Wats., California.

TYPE LOCALITY: Saxony, on *Asarum europaeum*.
DISTRIBUTION: From Idaho to Washington and northern California; also in Europe.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 11, f. 48.*
EXSICCATI: Barth. Fungi Columb. *4840;* Barth. N. Am. Ured. *1218, 1524, 1525, 1931;* Sydow, Ured. *1060.*

5. **Micropuccinia ornata** (Arth. & Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia ornata Arth. & Holway; Arth. Bull. Geol. Nat. Hist. Surv. Minn. **3**: 30. 1887.
Dicaeoma ornatum Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora ornata Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia ornata Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia amphigenous, closely crowded or confluent and circinating in groups 3–8 mm. across upon larger reddish spots, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, chocolate-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores oblong or ellipsoid-oblong, 16–24 by 35–48 μ, rounded or slightly narrowed above and below, constricted at septum; wall golden-brown, 2–3 μ thick, thickened at apex into a colorless umbo, 4–7 μ, smooth; pedicel colorless, as long as spore or longer.

This species is correlated with *Dicaeoma rubellum* (Pers.) Arth. & Fromme, the telial characters of the two species being similar or identical, and the hosts of the short-cycled form corresponding with the aecial hosts of the heteroecious form. These facts point to a common origin for the two species.

ON POLYGONACEAE:

Rumex Britannica L., Maine, Minnesota, New Hampshire, New York, Wisconsin.

TYPE LOCALITY: Vermilion Lake, Minnesota, on *Rumex Britannica*.
DISTRIBUTION: Northern border of the United States from Maine to Minnesota.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 11, f. 49.*
EXSICCATI: Barth. Fungi Columb. *4064;* Barth. N. Am. Ured. *2630;* Seym. & Earle, Econ. Fungi *379.*

6. **Micropuccinia Eurotiae** (D. Griff.) Arthur & Jackson.

Puccinia Eurotiae D. Griff. Bull. Torrey Club. **34**: 210. 1907.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in elongate groups on each side of the midrib, round, 0.5–1 mm. in diameter, early naked, pulvinate, becoming pulverulent, chocolate-brown,

ruptured epidermis inconspicuous; teliospores ellipsoid, 23–26 by 32–40 μ, rounded at both ends, slightly constricted at septum, the two cells readily falling apart by splitting of septum; wall golden- or chestnut-brown, thick, 2–3.5 μ, with a pale subcuticular layer extending through the septum, best seen in lactic acid, sometimes slightly thickened at apex, 5–6 μ, smooth; pedicel colorless, up to three times length of spore.

This species is correlated with *Dicaeoma Eurotiae* (Ellis & Ev.) Arth., the telial characters of the two species being essentially the same, notably in the unique manner of cell-disjunction, as well as the host of the short-cycled form being the same as the aecial host of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON CHENOPODIACEAE:

Eurotia lanata (Pursh) Moq., Nevada.
TYPE LOCALITY: Near Lovelocks, Nevada, on *Eurotia lanata.*
DISTRIBUTION: Known only from the type locality.

7. **Micropuccinia agnita** (Arth.) Arthur & Jackson.

Puccinia agnita Arth. Bull. Torrey Club **42**: 590. 1915.

O. Pycnia chiefly epiphyllous, loosely grouped on discolored spots, punctiform, noticeable, angularly globoid, 65–115 μ in diameter; ostiolar filaments about 35 μ long.

III. Telia chiefly hypophyllous, irregularly grouped on pale spots 4–6 mm. across, round or oblong, 0.2–0.8 mm. across, at first covered by the membranous epidermis, soon naked, very pulverulent, light chestnut-brown; teliospores ellipsoid, 21–27 by 29–42 μ, rounded or obtuse at both ends, slightly or not constricted at septum; wall golden-brown, 1.5–2 μ thick, thickened over the pores into a colorless papilla, 5–6 μ, rather inconspicuously verrucose, the pore of upper cell apical, of lower cell depressed two-thirds; pedicel colorless, fragile.

This species is correlated with *Allodus claytoniata* (Schw.) Arth., the telial characters of the two species being essentially alike, and the family of the known host of the short-cycled form being the same as that of the hosts of the long-cycled form.

ON PORTULACACEAE:

Claytonia megarrhiza (A. Gray) Parry, Colorado.
TYPE LOCALITY: Cumberland Mine, LaPlata Mountains, Colorado, on *Claytonia megarrhiza.*
DISTRIBUTION: Known only from the type locality.

8. **Micropuccinia detonsa** (Arth. & Holway) Arthur & Jackson.

Puccinia detonsa Arth. & Holway; Arth. Mycologia **10**: 130. 1918.

O. Pycnia unknown.

III. Telia hypophyllous and caulicolous, more or less confluent in round or elongate masses 1–2 mm. across, or sometimes scattered, on indefinite discolored areas, round, 0.3–0.6 mm. in diameter, early naked, pulvinate, light yellowish-brown, ruptured epidermis inconspicuous; teliospores oblong or fusiform-oblong, 12–15 by 30–40 μ, rounded or acute at apex, more or less narrowed below, somewhat constricted at septum; wall pale golden-brown, very thin, 1 μ or less, not or a little thickened above, up to 3 μ, smooth; pedicel colorless, about as long as spore.

ON CARYOPHYLLACEAE:

Stellaria ovata Willd., Costa Rica; Guatemala.
TYPE LOCALITY: San José, Costa Rica, on *Stellaria ovata.*
DISTRIBUTION: Central America.

9. **Micropuccinia Arenariae** (Schum.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Uredo Arenariae Schum. Enum. Pl. Saell. **2**: 232. 1803.
Uredo Alsines Schum. Enum. Pl. Saell. **2**: 232. 1803.
Puccinia Spergulae DC. Fl. Fr. **2**: 219. 1805.
Puccinia Dianthae DC. Fl. Fr. **2**: 220. 1805.
Puccinia Lychnites DC.; Poir. in Lam. Encyc. **8**: 247. 1808.
Uredo verrucosa Strauss, Ann. Wett. Ges. **2**: 107. 1810.
Puccinia Saginae Schmidt & Kunze, Deuts. Schwämme **9**: 6. 1819.
Puccinia Spergulae Arenariae-serpyllifoliae DC. Fl. Fr. **6**: 55. 1815.
Puccinia Lychnidearum Link. Ges. Nat. Freunde Berlin Mag. **7**: 25. 1815.
Puccinia crassa Link, Ges. Nat. Freunde Berlin Mag. **7**: 30. 1815.
Caeoma verrucosum Nees, Syst. Pilze Schw. 16. 1816.
Dicaeoma verrucosum Mart. Fl. Crypt. Erlang. 321. 1817.

Puccinia verrucosa Schlecht. Fl. Berol. **2**: 132. 1824.
Caeoma Arenariae Link, in Willd. Sp. Pl. **6**[2]: 27. 1825.
Puccinia Stellariae Duby, Bot. Gall. **2**: 887. 1830.
Puccinia caryophyllacearum Wallr. Fl. Crypt. Germ. **2**: 224. 1833.
Uredo Lychnidiarum Desmaz. Ann. Sci. Nat. II. **17**: 94. 1842.
Puccinia caryophyllacearum Spergulae Westend. Bull. Acad. Belg. **19**[3]: 124. 1852.
Puccinia Malachii L. Kirchn. Lotos **6**: 181. 1856.
Puccinia denticulata Otth, Mitth. Nat. Ges. Bern **1868**: 69. 1868.
Puccinia Agrostemmae Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 50. 1870.
Puccinia Moehringiae Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 51. 1870.
Puccinia circinans Fuckel, Jahr. Nass. Ver. Nat. **23–24**: 53. 1870.
Puccinia Arenariae Wint. in Rab. Krypt.-Fl. **1**[1]: 167. 1881.
Puccinia caudata Barclay, Jour. Asiat. Soc. Bengal **60**: 219. 1891.
Dicaeoma Arenariae Kuntze, Rev. Gen. **3**[3]: 467. 1898.
Dicaeoma Spergulae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Leptopuccinia Spergulae Rostr. Plant. Haandb. 270. 1902.
Leptopuccinia Dianthi Rostr. Plant. Haandb. 270. 1902.
Leptopuccinia Arenariae Rostr. Plant. Haandb. 271. 1902.
Dasyspora Arenariae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Spergulae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous and caulicolous, round or oval, scattered or gregarious on yellowish spots, often confluent, somewhat tardily naked, pulvinate, firm, at first cinnamon-brown, becoming blackish-brown, often cinereous from germination, ruptured epidermis conspicuous; teliospores fusiform or clavate, 13–19 by 32–50 μ, rounded or often acute above, rounded or more commonly narrowed below, somewhat constricted at septum; wall golden- or cinnamon-brown, 1–2 μ thick, thickened above to 10 μ, smooth; pedicel firm, colorless, once to twice length of spore.

ON CARYOPHYLLACEAE:

Alsine laeta (Richards.) Rydb. (*Stellaria longipes laeta* S. Wats.), Montana, Wyoming.
Alsine longipes (Goldie) Coville (*Stellaria longipes* Goldie), Alaska; Greenland.
Arenaria stricta Michx. (*A. Michauxii* Hook. f.), New York, Wisconsin.
Cerastium alpinum L., Greenland.
Cerastium strictum L. (*C. occidentale* Greene), Colorado, Montana.
Dianthus barbatus L., Connecticut, Massachusetts, Mississippi, New York, Pennsylvania.
Merckia physodes Fisch. (*Arenaria physodes* Fisch.), Northwest Territories.
Moehringia lateriflora (L.) Fenzl (*Arenaria lateriflora* L.), Maine, Montana.
Spergula arvensis L., Maine, New York.

TYPE LOCALITY: Island of Zealand, Denmark, on *Arenaria trinervia*.

DISTRIBUTION: Connecticut to northern Mississippi and central Colorado, northward to Greenland, Alaska, and the Arctic Ocean; also in Europe, Asia, and South America.

ILLUSTRATIONS: Corda, Ic. Fung. **4**: *pl. 4, f. 39;* Holway, N. Am. Ured. **1**: *pl. 15, f. 60a, b, c;* Fl. Ital. Crypt. Ured. *f. 68d;* Grove, Brit. Rust Fungi *f. 167–169*.

EXSICCATI: Barth. N. Am. Ured. *170, 924;* Ellis, N. Am. Fungi *1457;* Rel. Farl. *240;* Seym. & Earle, Econ. Fungi *263*.

10. **Micropuccinia hysteriiformis** (Peck) Arthur & Jackson.

Puccinia hysteriiformis Peck, Bot. Gaz. **6**: 276. 1881.
Dicaeoma hysteriiforme Kuntze, Rev. Gen. **3**[3]: 469. 1898.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, linear, 0.5–1.5 cm. long, tardily naked, firm, blackish, ruptured epidermis conspicuous; teliospores oblong or clavate, 16–20 by 32–46 μ, rounded above and below, slightly constricted at septum; wall light cinnamon-brown, 1–2 μ thick, greatly thickened at apex up to 8 μ, smooth; pedicel firm, colorless, or slightly tinted next to spore, once to once and a half length of spore.

ON CARYOPHYLLACEAE:

Arenaria congesta Nutt., Montana.
Arenaria uintahensis A. Nelson, Utah.

TYPE LOCALITY: Utah, on "*Arenaria verna*," error for *A. uintahensis*.

DISTRIBUTION: Northern Utah to central Montana.

ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 15, f. 61*.

EXSICCATI: Ellis & Ev. Fungi Columb. *1963;* Garrett, Fungi Utah. *14;* Sydow, Ured. *1928*.

11. **Micropuccinia Pulsatillae** (Kalchbr.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia compacta DeBary, Bot. Zeit. **16**: 83. 1858. Not *P. compacta* Berk. 1855 (nor Thüm. 1875; nor Kunze, 1903).
Puccinia Pulsatillae Kalchbr. Math. Term. Közlem. **3**: 307. 1865.

Puccinia DeBaryana Thüm. Flora **58**: 364. 1875.
Puccinia Anemones-virginianae Wint. in Rab. Krypt.-Fl. **1**[1]: 170. 1881. Not *P. Anemones-virginianae* Schw. 1822.
Puccinia Trautvetteriae Sydow & Holway; Sydow, Monog. Ured. **1**: 552. 1903.
Dasyspora DeBaryana Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Sclerotelium compactum Sydow, Ann. Myc. **19**: 172. 1921.
Sclerotelium Trautvetteriae Sydow, Ann. Myc. **19**: 172. 1921.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, or sometimes chiefly epiphyllous or hypophyllous, irregularly roundish, 1–5 mm. across, occasionally elongate to 8–10 mm., on yellowish or purple spots which are frequently depressed beneath, blackish, firm, covered by shining epidermis, compound by irregular development of golden-brown stromal hyphae; teliospores oblong-clavate or cylindric, 12–22 by 30–75 μ, rounded or acute above, narrowed below, slightly constricted at septum which is usually above the middle; wall 1.5–3 μ thick, golden-brown below, somewhat darker and thicker above, 4–8 μ, smooth; pedicel tinted, short, firm, up to 12 μ long.

ON RANUNCULACEAE:

Anemone Drummondii S. Wats., Oregon.
Anemone parviflora Michx., British Columbia, Quebec.
Clematis lasiantha Nutt., California.
Pulsatilla ludoviciana (Nutt.) A. Heller (*P. hirsutissima* Britton, *Anemone patens Nuttalliana* A. Gray), Colorado, Iowa, North Dakota, South Dakota; Alberta, Saskatchewan.
Trautvetteria grandis Nutt., Idaho, Oregon, Washington; British Columbia.

TYPE LOCALITY: Olaszi, Szepes, Hungary (now Spáleny Vlakhy, Czecho-Slovakia), on *Anemone Pulsatilla*.

DISTRIBUTION: Northeastern Iowa to northern Colorado and central California, and northward, and in eastern Quebec; also in Europe, eastern Asia, and Japan.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 12b;* Holway, N. Am. Ured. **1**: *pl. 2, f. 9a-c; pl. 3, f. 15;* Krypt.-Fl. Brand. Pilze *f. B173a;* Beitr. Krypt. Schweiz *f. 258–260;* Sitz.-ber. Böhm. Ges. Wiss. **1901**[2]: *f. 13–25, 32–44;* Math. Term. Közlem. **3**: *pl. 2, f. 12.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *12b;* Barth. N. Am. Ured. *1437;* Brenckle, Fungi Dak. *61;* Ellis, N. Am. Fungi *1456;* D. Griff. W. Am. Fungi *273a.*

12. **Micropuccinia Anemones-virginianae** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Anemones-virginianae Schw. Schr. Nat. Ges. Leipzig **1**: 72. 1822.
Puccinia solida Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia simplex Peck, Ann. Rep. N. Y. State Mus. **34**: 45. 1881.
Puccinia pallida Tracy, Jour. Myc. **7**: 281. 1893.
Dicaeoma solidum Kuntze, Rev. Gen. **3**[3]: 467. 1898.
Dicaeoma pallidum Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dicaeoma simplex Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dicaeoma Anemones-virginianae Arth. Proc. Ind. Acad. Sci. **1898**: 181. 1899.
Dasyspora Anemones-virginianae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia missouriensis Arth. Bull. Torrey Club **45**: 146. in part. 1918.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous or caulicolous, rarely epiphyllous, on light-green spots often becoming purple, the upper surface usually slightly sunken, scattered, round, small, 0.5–1.5 mm. across, or occasionally gregarious and confluent covering considerable areas of leaf, early naked, pulvinate, compact, blackish-brown, often cinereous from germination, ruptured epidermis not conspicuous; teliospores clavate or cylindric, 12–16 by 35–60 μ, rounded or obtuse above, narrowed below, upper cell usually shorter than lower, slightly constricted at septum; wall golden-brown, slightly darker above, thin, 1–1.5 μ, thickened up to 5–10 μ at apex, smooth; pedicel firm, short, slightly tinted.

ON RANUNCULACEAE:

Anemone canadensis L. (*A. pennsylvanica* L.), Michigan, New York.
Anemone cylindrica A. Gray, Iowa, Michigan, Minnesota, Nebraska, New York, North Dakota, South Dakota, Wisconsin.
Anemone riparia Fernald, Maine, Vermont.
Anemone virginiana L., Connecticut, Delaware, Indiana, Iowa, Kansas, Minnesota, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Tennessee, Vermont, Virginia, Wisconsin; Ontario, Quebec.

TYPE LOCALITY: North Carolina, on *Anemone virginiana.*

DISTRIBUTION: North Carolina to Kansas, and northward into Canada.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 12a;* Holway, N. Am. Ured. **1**: *pl. 2, f. 10;* Sitz.-ber. Böhm. Ges. Wiss. **1901**[2]: *f. 1–12;* Bot. Gaz. **14**: *pl. 15, f. 8–10.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *12a;* Barth. Fungi Columb. *3543, 4137, 4658;* Barth. N. Am. Ured. *19, 1130, 1331, 1831;* Brenckle, Fungi Dak. *289;* Ellis & Ev. Fungi Columb. *493, 1845;* Ellis & Ev. N. Am. Fungi *1847.*

13. **Micropuccinia gemella** (Dietel & Holway) Arthur & Jackson.

Puccinia gemella Dietel & Holway; Sydow, Monog. Ured. **1**: 541. 1903.

O. Pycnia unknown.

III. Telia amphigenous and petiolicolous, scattered, round or oblong, 0.8–1.5 mm. across, early naked, pulverulent, pale cinnamon- or chocolate-brown, ruptured epidermis conspicuous; teliospores fusiform or fusiform-oblong, 20–26 by 40–58 μ, narrowed above and below, not constricted at septum; wall chestnut-brown, rather thin, 1–1.5 μ, thickened into a lighter colored umbo at apex, 5–10 μ, smooth (sometimes teliospores 15–21 by 40–50 μ, germinating at once, the wall nearly colorless); pedicel colorless, fragile.

ON RANUNCULACEAE:

Caltha biflora DC., Oregon, Washington.
Caltha Howellii Greene, California.
Caltha leptosepala DC., Alaska, Idaho, Washington.

TYPE LOCALITY: Mt. Tacoma [Rainier], Washington, on *Caltha leptosepala*.
DISTRIBUTION: Locally in northwestern United States and southeastern Alaska.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 1, f. 3.*
EXSICCATI: Barth. Fungi Columb. *4057;* Barth. N. Am. Ured. *634;* Sydow, Ured. *1769.*

14. **Micropuccinia Treleasiana** (Paz.) Arthur & Jackson.

Puccinia Treleasiana Paz.; Rab.-Wint.-Paz. Fungi Eur. *3821* (Hedwigia **31**: 317). 1892.

O. Pycnia unknown.

III. Telia amphigenous and petiolicolous, scattered or somewhat gregarious, often confluent, round or oblong, 0.8–2 mm. across, early naked, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 19–25 by 33–48 μ, rounded or somewhat obtuse above and below, slightly or not constricted at septum; wall light chestnut-brown, rather thin, 1–2 μ, thickened into a low, pale umbo at apex, 3–6 μ, very minutely rugose, appearing smooth when wet; pedicel colorless, short, one-half length of spore.

ON RANUNCULACEAE:

Caltha biflora DC., Washington.
Caltha leptosepala DC., British Columbia.
Caltha rotundifolia (Huth) Greene (*C. leptophylla rotundifolia* Huth, *C. chionophila* Greene), Colorado, Nevada, Utah, Wyoming.

TYPE LOCALITY: Argentine Pass, Colorado, on *Caltha leptosepala*, now determined as *C. rotundifolia.*
DISTRIBUTION: Colorado northward into Canada.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 1, f. 5.*
EXSICCATI: Barth. Fungi Columb. *2470;* Barth. N. Am. Ured. *171;* Clements, Crypt. Form. Colo. *326;* Ellis & Ev. Fungi Columb. *1868;* Ellis & Ev. N. Am. Fungi *3244;* Garrett, Fungi Utah. *23;* Sydow, Ured. *1944;* Rab.-Wint. Fungi Eur. *3821.*

15. **Micropuccinia Delphinii** (Dietel & Holway) Arthur & Jackson.

Puccinia Delphinii Dietel & Holway; Dietel, Hedwigia **32**: 29. 1893.
Dicaeoma Delphinii Kuntze, Rev. Gen. **3**[3]: 468. 1898.

O. Pycnia not seen.

III. Telia chiefly hypophyllous and petiolicolous, small, round, 0.3–0.5 mm. across, gregarious and often confluent, covering large areas of leaf-surface, chestnut-brown, early naked, pulverulent, ruptured epidermis conspicuous; teliospores ellipsoid, 16–24 by 24–32 μ, rounded at both ends, scarcely constricted at septum; wall cinnamon-brown, uniformly thin, 1–1.5 μ, minutely and inconspicuously verrucose; pedicel short, fragile.

ON RANUNCULACEAE:

Delphinium sp., California.

TYPE LOCALITY: King's River Canyon, California, on *Delphinium* sp.
DISTRIBUTION: Known only from the type locality.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 1, f. 6.*

16. **Micropuccinia andina** (Dietel & Neger) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Ranunculi Seym.; Burrill, Bot. Gaz. **9**: 191. 1884. Not *P. Ranunculi* A. Blytt, 1882.
Dicaeoma Ranunculi Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia andina Dietel & Neger, Bot. Jahrb. **27**: 4. 1899.

Puccinia diffusa Holway, N. Am. Ured. 1: 13. 1905.
Dasyspora Ranunculi Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, numerous, scattered, commonly gregarious but not confluent, occupying large areas of leaf-surface, round, 0.4–0.8 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 18–24 by 24–35 μ, rounded above and below, scarcely constricted at septum; wall cinnamon-brown, uniformly thin, 1–1.5 μ, minutely and very inconspicuously verrucose-rugose; pedicel hyaline, fragile, short, occasionally laterally inserted; mesospores frequently intermingled.

ON RANUNCULACEAE:
Ranunculus septentrionalis Poir., Illinois.
Ranunculus sp., Mexico.
TYPE LOCALITY: Andes Mountains, Valdivia, Chile, on *Ranunculus peduncularis*.
DISTRIBUTION: One collection each in northern Illinois and Mexico; also in South America.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 3, f. 16*.

17. **Micropuccinia Ranunculi** (A. Blytt) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Ranunculi A. Blytt, Forh. Vid.-Selsk. Christ. **1882**[5]: 12. 1882.
Puccinia Blyttiana Lagerh. Bot. Notiser **1892**: 169. 1892.
Puccinia Nuttallii Ellis & Ev. Bull. Torrey Club **24**: 283. 1897.
Dicaeoma Blyttianum Kuntze, Rev. Gen. **3**[3]: 468. 1898.

O. Pycnia unknown.

III. Telia amphigenous, scattered or more commonly confluent, round, 0.5–2.5 mm. across, more elongate on petioles, somewhat tardily naked, pulverulent, blackish-brown, ruptured epidermis conspicuous; teliospores somewhat angularly ellipsoid or oblong, 19–26 by 32–45 μ, rounded or obtuse above, often narrowed below, not or scarcely constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, with an abrupt subhyaline papilla over pore of upper and lower cell, irregularly tuberculate, the markings sparsely scattered or in ridges; pedicel colorless, fragile, short.

A few spores (aeciospores?) occur in particularly vigorous sori in the Arizona collections, globoid, 16–20 by 18–24 μ; wall colorless or light golden-brown, 1–1.5 μ thick, very finely and closely verrucose, the pores obscure.

ON RANUNCULACEAE:
Cyrtorhyncha neglecta Greene, Colorado.
Cyrtorhyncha ranunculina Nutt. (*Ranunculus Nuttallii* A. Gray), Colorado, Wyoming.
Ranunculus Eschscholtzii Schlecht., Utah.
Ranunculus glaberrimus Hook., Colorado.
Ranunculus stenolobus Rydb., Utah.
Ranunculus subsagittatus (A. Gray) Greene, Arizona.
Ranunculus Suksdorfii A. Gray, Washington; British Columbia.
TYPE LOCALITY: Norway, on *Ranunculus auricomus*.
DISTRIBUTION: Central Colorado to Nevada, northward to British Columbia; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**[2]: *f. 69;* Holway, N. Am. Ured. 1: *pl. 3, f. 17*.
EXSICCATI: Barth. N. Am. Ured. *2631;* Garrett, Fungi Utah. *109*.

18. **Micropuccinia Berberidis-trifoliae** (Dietel & Holway) Arthur & Jackson.

Puccinia Berberidis-trifoliae Dietel & Holway; Holway, Bot. Gaz. **31**: 328. 1901.

O. Pycnia unknown.

III. Telia hypophyllous, scattered, round, on discolored spots, conspicuously elevated, 0.5–5 mm. across, early naked, pulvinate, compact, dark chocolate-brown, ruptured epidermis not conspicuous; teliospores irregularly ellipsoid, clavate or terete, 15–24 by 30–50 μ, rounded, obtuse, or attenuate above, rounded or more commonly narrowed below, not or slightly constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, much thicker above, 4–13 μ, smooth or with a few indistinct striations most evident at apex; pedicel firm, concolorous, as long as spore; mesospores occasionally intermixed.

ON BERBERIDACEAE:
Mahonia Swaseyi (Buckl.) Fedde (*Berberis trifolia* Schultes), Mexico (state).
TYPE LOCALITY: Rio Hondo, near City of Mexico, Mexico, on *Berberis trifolia*.

DISTRIBUTION: Known only from the type locality.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 4, f. 20.*
EXSICCATI: Barth. N. Am. Ured. *1225.*

19. **Micropuccinia Brandegei** (Peck) Arthur & Jackson.

Puccinia Brandegei Peck, Bot. Gaz. **7**: 44. 1882.
Dicaeoma Brandegei Kuntze, Rev. Gen. **3**[3]: 468. 1898.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, crowded in groups 1–2 mm. across, round or oblong, 0.2–0.8 mm. across, somewhat tardily naked, pulverulent, bullate, cinnamon- or light chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 18–21 by 29–34 μ, rounded or somewhat acute above and below, slightly constricted at septum; wall cinnamon-brown, thin, 1–1.5 μ, slightly thickened into a small colorless papilla over the pores, up to 2 μ, smooth; pedicel colorless, fragile.

ON FUMARIACEAE:
Capnoides Brandegei (S. Wats.) A. Heller (*Corydalis Brandegei* S. Wats.), Colorado.
TYPE LOCALITY: Colorado, on *Corydalis Brandegei.*
DISTRIBUTION: Known only from the type locality.

20. **Micropuccinia Dentariae** (Alb. & Schw.) Arthur & Jackson.

Uredo Dentariae Alb. & Schw. Consp. Fung. 129. 1805.
Caeoma Dentariae Link, in Willd. Sp. Pl. **6**[2]: 24. 1825.
Puccinia fusca Dentariae Wallr. Fl. Crypt. Germ. **2**: 220. 1833.
Puccinia Dentariae Fuckel, Jahrb. Nass. Ver. Nat. **25–26**: 295. 1871.

O. Pycnia not seen.

III. Telia amphigenous and caulicolous, the foliicolous sori small, 0.5–0.8 mm. across, gregarious on vesiculose-inflated areas, the caulicolous and petiolicolous sori on hypertrophied areas, often confluent, tardily naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores clavate or cylindric, 15–18 by 32–50 μ, rounded or obtuse above, rounded or somewhat narrowed below, slightly or noticeably constricted at septum; wall uniformly dark cinnamon-brown, 1.5–3 μ thick, slightly thickened above, 4–6 μ, smooth both when wet and dry in American collections, distinctly striate when dry in European collections; pedicel colorless, short, deciduous.

ON BRASSICACEAE:
Dentaria tenella Pursh, Oregon.
TYPE LOCALITY: Neuwied, Prussia, on *Dentaria bulbifera.*
DISTRIBUTION: Western Oregon; also in central and northern Europe.

21. **Micropuccinia Drabae** (Rudolphi) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Drabae Rudolphi, Linnaea **4**: 115. 1829.
Puccinia ambiens Rostr. Bot. Tidsskr. **11**: 75. 1879.
Puccinia Hazslinszkyi De-Toni, in Sacc. Syll. Fung. **7**: 692. 1888.
Puccinia Drabae arctica P. Henn.; Allesch. & Henn. Bibl. Bot. **8**[42a]: 41. 1897.
Dicaeoma Drabae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Puccinia Cochleariae Lindr. Acta Soc. Faun. Fl. Fenn. **22**[3]: 10. 1902.
Dasyspora Drabae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia caulicolous, fruticolous or rarely hypophyllous, roundish, elliptic or elongate, frequently confluent, becoming pulverulent, chestnut-brown, long covered by the cinereous epidermis that finally breaks away in large pieces; teliospores broadly ellipsoid or oblong, 13–20 by 26–38 μ, rounded above and below, slightly or noticeably constricted at septum; wall dark cinnamon-brown, 1.5–3 μ, slightly or not thickened at apex, finely and evenly verrucose-rugose; pedicel colorless, fragile, deciduous.

ON BRASSICACEAE:
Cochlearia officinalis L. (*C. fenestrata* R. Br., *C. groenlandica* L.), Greenland.
Draba arabisans Michx., Quebec.
Draba globosa Payson, Utah.
Draba hirta L. (*D. arctica* Vahl), Greenland.
Draba incana L., Greenland.
Draba incerta Payson, Alberta.

TYPE LOCALITY: Near Muggendorf, Germany, on *Draba lasiocarpa*.
DISTRIBUTION: Southeastern Quebec to Greenland, and in northern Utah and northern Alberta; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**²: *f. 105;* Holway, N. Am. Ured. **1**: *pl. 17, f. 64.*
EXSICCATI: Garrett, Fungi Utah. *116.*

22. **Micropuccinia utahensis** (Garrett) Arthur & Jackson.

Puccinia utahensis Garrett; Holway, N. Am. Ured. **1**: 46. 1906.
Puccinia Clementis Garrett, Mycologia **6**: 249. 1914.

O. Pycnia unknown.

III. Telia amphigenous, scattered, round, 0.5–1.5 mm. across, occasionally confluent and elongate, somewhat tardily naked, becoming pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, often angular, 16–19 by 30–44 μ, rounded above, rounded or occasionally narrowed below, noticeably constricted at septum; wall light chestnut-brown, 1.5–2 μ thick, sub-hyaline papilla at apex, 3–5 μ, minutely and finely verrucose, occasionally in longitudinal lines; pedicel colorless, fragile, deciduous.

ON BRASSICACEAE:
Parrya platycarpa Rydb., Utah.
Thlaspi glaucum A. Nelson, Utah.
TYPE LOCALITY: [Big Cottonwood Canyon, Salt Lake County], Utah, on *Thlaspi glaucum.*
DISTRIBUTION: Northern Utah.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 18, f. 67.*
EXSICCATI: Garrett, Fungi Utah. *144.*

23. **Micropuccinia Thlaspeos** (Schubert) Arthur & Jackson.

Puccinia Thlaspeos Schubert; Ficinus & Schubert, Fl. Dresd. **2**: 254. 1823.
Puccinia Thlaspidis Vuill. Bull. Soc. Bot. Fr. **32**: 184. 1885.
Puccinia Vuilleminii De-Toni, in Sacc. Syll. Fung. **7**: 692. 1888.
Leptopuccinia Thlaspeos Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia not seen.

III. Telia chiefly hypophyllous, evenly distributed over the surface of the leaf, occasionally scattered on upper surface, small, round, 0.3–0.5 mm. across, not confluent, early naked, pulvinate, light chestnut-brown, becoming cinereous from germination, ruptured epidermis not conspicuous; teliospores oblong or clavate, 14–18 by 32–45 μ, rounded above, rounded or more commonly narrowed below, slightly constricted at septum; wall thin, 1–1.5 μ, golden-brown, thicker above up to 8 μ, smooth; pedicel colorless, persistent, once to once and a half length of spore.

ON BRASSICACEAE:
Thlaspi glaucum A. Nelson, Colorado, Utah.
Thlaspi Nuttallii Rydb., Colorado.
Thlaspi purpurascens Rydb. (*T. alpestre* Am. Auth.), Idaho.
TYPE LOCALITY: Near Dresden, Germany, on *Thlaspi montanum.*
DISTRIBUTION: Southern Utah and Colorado to central Idaho; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**²: *f. 226;* Holway, N. Am. Ured. **1**: *pl. 17, f. 66.*
EXSICCATI: Garrett, Fungi Utah. *142.*

24. **Micropuccinia Holboellii** (Hornem.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Aecidium Holboellii Hornem. Fl. Dan. **37**: 11. 1840.
Puccinia Porteri Peck; Porter & Coult. Syn. Fl. Colo. 164. 1874.
Puccinia Barbarae Cooke, Grevillea **8**: 34. 1879.
Puccinia Cheiranthi Ellis & Ev.; Vasey, Bot. Gaz. **10**: 366. 1885.
Puccinia Holboellii Rostr. Medd. Grønland **3**: 534. 1888.
Puccinia palefaciens Dietel & Holway; Dietel, Erythea **2**: 128. 1894.
Dicaeoma Barbarae Kuntze, Rev. Gen. **3**³: 468. 1898.
Dicaeoma Cheiranthi Kuntze, Rev. Gen. **3**³: 468. 1898.
Dicaeoma Holboellii Kuntze, Rev. Gen. **3**³: 469. 1898.
Dicaeoma Porteri Kuntze, Rev. Gen. **3**³: 470. 1898.
Dasyspora palefaciens Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia Holboelli Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia amphigenous, numerous, conspicuous, scattered over upper surface of leaf or among the telia, or wanting, papillose, honey-yellow, globose, depressed-globose, or flask-shaped, 110–120 by 120–150 μ; ostiolar filaments 30–50 μ long, partially agglutinate.

III. Telia chiefly hypophyllous, evenly and closely distributed over the leaf, systemic,

occasionally scattered on the upper surface, round, 0.5–0.8 mm. across, early naked, cinnamon- or chestnut-brown, becoming cinereous from germination, ruptured epidermis noticeable; teliospores oblong or oblong-clavate, occasionally ellipsoid, 16–24 by 30–60 μ, rounded or obtuse above, rounded or more commonly narrowed below, not or slightly constricted at septum; wall nearly colorless or chestnut-brown, 1.5–2 μ thick, 5–8 μ above, smooth or obscurely striate; pedicel colorless, persistent, once to twice length of spore.

This species is correlated with *Dicaeoma monoicum* (Peck) Arth. & Fromme and *Allodus consimilis* (Ellis & Ev.) Orton, the morphological characters of like stages in the three species being similar or identical, and the hosts of the aecial stage of the heteroecious species corresponding with the hosts of the two autoecious species. This agreement doubtless indicates a common origin for the three species.

ON BRASSICACEAE:

Arabis ambigua DC., Alaska.
Arabis arcuata A. Gray, California.
Arabis Breweri S. Wats., California.
Arabis canescens Nutt., Nevada.
Arabis Crandallii B. L. Robinson, Colorado.
Arabis divaricarpa A. Nelson, Idaho; Alberta.
Arabis Drummondii A. Gray, Montana; British Columbia.
Arabis exilis A. Nelson, Colorado, Montana.
Arabis furcata S. Wats., Washington.
Arabis Holboellii Hornem., Greenland.
Arabis lignipes A. Nelson, Alberta.
Arabis Lyallii S. Wats., Montana, Washington; British Columbia.
Arabis lyrata occidentalis S. Wats., Alaska.
Arabis microphylla Nutt., California, Idaho.
Arabis perennans S. Wats., California.
Arabis retrofracta Graham (*A. Holboellii* Am. Auth.), Oregon, Utah.
Cheiranthus pygmaeus Adams, Grinnell Land.
Draba spectabilis Greene, Colorado, Utah.
Schoenocrambe linifolia (Nutt.) Greene (*Sisymbrium linifolium* Nutt.), Montana, Utah, Wyoming.
Schoenocrambe pinnata Greene, Colorado.
Smelowskia Fremontii S. Wats., Nevada.

TYPE LOCALITY: Greenland, on *Arabis Holboellii*.

DISTRIBUTION: Central Colorado to southern California northward to Alberta and southwestern Alaska, and from Greenland to Grinnell Land.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa 3^2: *pl. 3, f. 17a, b;* Fl. Dan. *pl. 2220;* Holway, N. Am. Ured. 1: *pl. 15, f. 63a, pl. 16, f. 63b–g, pl. 17, f. 63h–j.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *17a, b;* Barth. N. Am. Ured. *149;* Ellis, N. Am. Fungi *1834;* Ellis & Ev. N. Am. Fungi *2889b, 2891;* Garrett, Fungi Utah. *4;* Sydow, Ured. *1926.*

25. **Micropuccinia Cruciferarum** (Rudolphi) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Cruciferarum Rudolphi, Linnaea **4**: 391. 1829.
Puccinia Cardamines Niessl, Verh. Nat. Ver. Brünn **10**: 164. 1872.
Puccinia Cardamines-bellidifoliae Dietel, Bot. Jahrb. **27**: 4. 1899.
Dasyspora Cruciferarum Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous and petiolicolous, scattered or solitary, round, 0.5–2 mm. across, rarely confluent, often elongate when petiolicolous, early naked, becoming pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores oblong or ellipsoid, 14–18 by 30–38 μ, rounded or obtuse above, rounded or occasionally narrowed below, noticeably constricted at septum; wall dark cinnamon-brown, 1–2 μ, with sub-hyaline umbo at apex, 3–5 μ thick, finely verrucose; pedicel colorless, usually deciduous.

ON BRASSICACEAE:

Cardamine bellidifolia L., Greenland; British Columbia.
Cardamine cordifolia A. Gray, Wyoming.

TYPE LOCALITY: Scandinavia, on *Cardamine bellidifolia.*

DISTRIBUTION: Southern Wyoming to British Columbia and Greenland; also in Europe.

ILLUSTRATION: Beitr. Krypt. Schweiz 2^2: *f. 104.*

26. **Micropuccinia aberrans** (Peck) Arthur & Jackson.

Puccinia aberrans Peck, Bot. Gaz. **4**: 217. 1879.
Dicaeoma aberrans Kuntze, Rev. Gen. 3^3: 467. 1898.

O. Pycnia amphigenous, scattered over large areas, preceding or among the telia, puncti-

form, honey-yellow, globose, 100–150 μ in diameter; ostiolar filaments delicate, agglutinate into a column, 30–80 μ long.

III. Telia amphigenous, chiefly hypophyllous, small, round, 0.3–0.5 mm. across, closely gregarious, covering large areas, at first pulvinate, early naked, chestnut-brown, becoming pulverulent, ruptured epidermis conspicuous; teliospores ellipsoid, oblong, or oblong-ovate, 22–28 by 35–45 μ, rounded or obtuse above, rounded or more commonly narrowed below, not or slightly constricted at septum; wall moderately thick, 2–3.5 μ, chestnut-brown, thickened above, 7–10 μ, obscurely verrucose-rugose, appearing smooth when wet; pedicel colorless, short, usually deciduous; mesospores and three-celled teliospores occur.

ON BRASSICACEAE:
Smelowskia americana Rydb. (*S. calycina* Am. Auth.), Colorado, Montana, Utah.
Smelowskia lobata Rydb., Nevada.
TYPE LOCALITY: Alta, Wasatch Mountains, Utah, on *Smelowskia calycina*.
DISTRIBUTION: Central Colorado to Nevada, northward to northern Montana.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 17, f. 65*.
EXSICCATI: Garrett, Fungi Utah. *52;* Rab.-Wint. Fungi Eur. *3505*.

27. **Micropuccinia Rydbergii** (Garrett) Arthur & Jackson.

Puccinia Rydbergii Garrett, Mycologia 6: 251. 1914.

O. Pycnia unknown.

III. Telia amphigenous, scattered or crowded in small groups, round or elliptic, 0.2–1.2 mm. across, rather tardily naked, pulverulent, bullate, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 16–20 by 26–32 μ, rounded above and below, or slightly narrowed below, slightly constricted at septum; wall cinnamon-brown, rather thick, 1.5–2.5 μ, sometimes somewhat thickened at apex, 3–4 μ, very closely and finely verrucose, the pore of upper cell apical, of lower cell in lower half of cell; pedicel colorless, fragile, short.

ON CRASSULACEAE:
Gormania debilis (S. Wats.) Britton (*Sedum debile* S. Wats.), Utah.
Sedum stenopetalum Pursh, Utah; British Columbia.
TYPE LOCALITY: Mountains above Gold Basin, LaSal Mountains, San Juan County, Utah, on *Sedum stenopetalum*.
DISTRIBUTION: Mountains of Utah and British Columbia.
EXSICCATI: Garrett, Fungi Utah. *220*.

28. **Micropuccinia Rhodiolae** (Berk. & Br.) Arthur & Jackson.

Puccinia Rhodiolae Berk. & Br. Ann. Mag. Nat. Hist. II. 5: 462. 1850.
Puccinia Rhodiolae A. Blytt, Forh. Vid.-Selsk. Christ. 1882[8]: 10. 1882.
Puccinia Blyttii De-Toni, in Sacc. Syll. Fung. 7: 700. 1888.
Dicaeoma Blyttii Kuntze, Rev. Gen. 3[3]: 468. 1898.
Dicaeoma Rhodiolae Kuntze, Rev. Gen. 3[3]: 470. 1898.

O. Pycnia unknown.

III. Telia amphigenous, crowded in groups 5–10 mm. across, round or oblong, 0.2–0.7 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 20–26 by 28–32 μ, rounded above and below, not constricted at septum; wall cinnamon-brown, 1.5–2 μ thick, slightly thickened over the pores into a light-colored papilla, up to 3 μ, smooth or occasionally with a few irregular lines of verrucose markings, the pore of upper cell apical, of lower cell near pedicel; pedicel colorless, short, fragile.

ON CRASSULACEAE:
Rhodiola integrifolia Raf. (*Sedum Rhodiola* Coult. not DC.), Colorado.
TYPE LOCALITY: Glen Callater, Scotland, on *Sedum Rhodiola*.
DISTRIBUTION: Central Colorado; also in northern Europe.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 23, f. 80;* Grove, Brit. Rust Fungi *f. 157*.
EXSICCATI: Clements, Crypt. Form. Colo. *575*.

29. **Micropuccinia laurentiana** (Trel.) Arthur & Jackson.

Puccinia laurentiana Trel. Harriman Alaska Exp. Crypt. 38. 1904.

O. Pycnia unknown.

III. Telia hypophyllous, round, about 1 mm. in diameter, pulverulent, chestnut-brown;

teliospores oblong, 18–20 by 40–50 μ, rounded or obtuse above, rounded or narrowed below, strongly constricted at septum; wall chestnut-brown, 3–3.5 μ thick, thickened by colorless papilla to 8 μ at apex, smooth; pedicel colorless, fragile, once to once and a half length of spore.

ON SAXIFRAGACEAE:

Ocrearia nudicaulis (D. Don) Small (*Saxifraga nudicaulis* D. Don), Alaska.

TYPE LOCALITY: St. Lawrence Island, Bering Sea, on "*Saxifraga neglecta stolonifera*," now interpreted as *S. nudicaulis*.

DISTRIBUTION: Known only from the type locality.

ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 18, f. 70a, b.*

30. **Micropuccinia pallido-maculata** (Ellis & Ev.) Arthur & Jackson.

Puccinia pallido-maculata Ellis & Ev.; Holway, N. Am. Ured. 1: 49. 1906.

O. Pycnia unknown.

III. Telia amphigenous, small, round, 0.5–0.8 mm. across, gregarious and confluent, often circinate on pale-yellowish spots 1–3 mm. across, early naked, chestnut-brown, pulverulent, ruptured epidermis conspicuous; teliospores somewhat irregularly fusiform, or more rarely ellipsoid or oblong, 13–16 by 26–38 μ, obtuse above and below, not constricted at septum; wall 1.5–2 μ thick, the apex and the pore of lower cell at septum covered by an abrupt hyaline papilla, 3–4 μ thick, smooth; pedicel colorless, short, deciduous.

ON SAXIFRAGACEAE:

Micranthes arguta (D. Don) Small (*Saxifraga arguta* D. Don, *S. punctata* Am. Auth.), Colorado, Idaho, Montana, Utah.

Micranthes Lyallii (Engler) Small (*Saxifraga Lyallii* Engler), Alberta.

TYPE LOCALITY: Sangre de Christo Range, Colorado, on *Saxifraga punctata*.

DISTRIBUTION: Mountains of Colorado and Utah northward to Alberta.

ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 19, f. 73a, b.*

EXSICCATI: Barth. N. Am. Ured. *1562;* Ellis & Ev. N. Am. Fungi *2234;* Garrett, Fungi Utah. *34;* Sydow, Ured. *1933.*

31. **Micropuccinia Heucherae** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Uredo Heucherae Schw. Schr. Nat. Ges. Leipzig 1: 71. 1822.
Puccinia Saxifragae Schlecht. Fl. Berol. 2: 134. 1824.
Caeoma Heucherae Link, in Willd. Sp. Pl. 6[2]: 28. 1825.
Puccinia Tiarellae Berk. & Curt. Grevillea 3: 53. 1874.
Puccinia spreta Peck, Ann. Rep. N. Y. State Mus. 29: 67. 1878.
Puccinia congregata Ellis & Hark. Bull. Calif. Acad. 1: 26. 1884.
Puccinia Heucherae Dietel, Ber. Deuts. Bot. Ges. 9: 42. 1891.
Dicaeoma Saxifragarum Kuntze, Rev. Gen. 3[3]: 467. 1898.
Dicaeoma congregatum Kuntze, Rev. Gen. 3[3]: 468. 1898.
Dicaeoma Tiarellae Kuntze, Rev. Gen. 3[3]: 470. 1898.
Dicaeoma spretum Kuntze, Rev. Gen. 3[3]: 470. 1898.
Micropuccinia Saxifragae Rostr. Medd. Grønland 30: 114. 1904.
Dasyspora Saxifragae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, chiefly hypophyllous, scattered or gregarious and frequently confluent, occasionally circinate, 0.5–3 mm. across, early naked, chestnut- or chocolate-brown, flat and pulverulent, or in germinating condition pulvinate and cinereous, ruptured epidermis usually not conspicuous; teliospores ellipsoid, oblong or somewhat fusiform, 13–19 by 28–45 μ, rounded or obtuse above, rounded or narrowed below, slightly or not constricted at septum; wall light cinnamon-brown, 1–2 μ thick, with broad thickening above up to 8 μ, or with sub-hyaline papilla, smooth, or with evident longitudinal striae; pedicel colorless, fragile, twice length of spore or shorter, deciduous.

ON SAXIFRAGACEAE:

Heterisia Mertensiana (Bong.) Small (*Saxifraga Mertensiana* Bong.), Idaho, Washington.
Heuchera americana L., North Carolina.
Heuchera bracteata (Torr.) Seringe, Colorado.
Heuchera cylindrica Dougl., Washington.
Heuchera elegans Abrams, California.
Heuchera glabella T. & G., Washington.
Heuchera glabra Willd., Alaska; British Columbia.
Heuchera Hallii A. Gray, Colorado.

Heuchera micrantha Dougl., California, Oregon.
Heuchera rubescens Torr., Arizona.
Heuchera villosa Michx., North Carolina.
Heuchera sp., Idaho.
Leptaxis Menziesii (Pursh) Raf. (*Tolmiea Menziesii* T. & G., *Heuchera Menziesii* Hook.), Oregon.
Lithophragma affinis A. Gray (*Tellima affinis* Boland.), California.
Micranthes arguta (D. Don) Small (*Saxifraga arguta* D. Don, *S. punctata* Am. Auth. not L.), Colorado, Idaho, Montana, New Mexico, Utah, Washington.
Micranthes fragosa (Suks.) Small (*Saxifraga fragosa* Suks.), Washington.
Micranthes Nelsoniana (D. Don) Small (*Saxifraga Nelsoniana* D. Don), Alaska.
Mitella diphylla L., Iowa, Michigan, New York, Pennsylvania, Wisconsin; Ontario.
Mitella nuda L., Maine, Michigan, Montana, New York, Wisconsin; Ontario.
Ozomelis stauropetala (Piper) Rydb. (*Mitella stauropetala* Piper), Idaho.
Pectiantia Breweri (A. Gray) Rydb. (*Mitella Breweri* A. Gray), California, Oregon, Washington; British Columbia.
Pectiantia ovalis (Greene) Rydb. (*Mitella ovalis* Greene), Oregon,
Pectiantia pentandra (Hook.) Rydb. (*Mitella pentandra* Hook.), Colorado, Idaho, Utah, Washington.
Tellima grandiflora (Pursh) Dougl. (*Mitella grandiflora* Pursh), Alaska, California, Oregon, Washington; British Columbia.
Tiarella cordifolia L., Michigan, New York, Vermont, West Virginia; Ontario, Quebec.
Tiarella trifoliata L., Alaska, Washington.
Tiarella unifoliata Hook., Idaho, Montana, Oregon, Washington; British Columbia.

TYPE LOCALITY: North Carolina, on *Heuchera americana*.

DISTRIBUTION: Nearly throughout the United States and Canada; also in Europe.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 5, 6a, b;* Holway, N. Am. Ured. **1**: *pl. 18, f. 69, pl. 20, f. 74a–f, pl. 21, f. 74g–j;* Krypt.-Fl. Brand. Pilze **3**: *B14;* Ured. Schweiz **2**[2]: *f. 117;* Ber. Deuts. Bot. Ges. **9**: *pl. 3, f. 3, 8–11;* Grove, Brit. Rust Fungi *f. 160.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *5, 6a, b;* Barth. Fungi Columb. *2359, 3171, 4462, 4965;* Barth. N. Am. Ured. *40, 241, 454, 640, 745, 849, 1449, 1450, 1451, 1552, 1553, 1554;* Clements, Crypt. Form. Colo. *143;* Ellis, N. Am. Fungi *1049, 1463, 1464;* Ellis & Ev. Fungi Columb. *345, 1763, 2059;* Ellis & Ev. N. Am. Fungi *2233, 2414, 3571;* Garrett, Fungi Utah. *58, 108;* Sydow, Ured. *338, 867, 1917, 1925, 2417.*

32. **Micropuccinia curtipes** (Howe) Arth. & Jackson, Bull. Torrey Club **48**: 42. 1921.

Puccinia curtipes Howe, Bull. Torrey Club **5**: 3. 1874.
Puccinia striata Cooke, Grevillea **7**: 3. 1878.
Puccinia Saxifragae curtipes Dietel, Ber. Deuts. Bot. Ges. **9**: 40. 1891.
Dicaeoma curtipes Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Puccinia striatospora Peck, Mycologia **5**: 71. 1913.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, round, 0.5–0.8 mm. across, usually confluent in irregular groups, often elongate when on petioles and veins, usually pulverulent, rarely pulvinate in the germinating condition, chestnut-brown, early naked, ruptured epidermis noticeable; teliospores 16–20 by 26–34 μ, broadly ellipsoid or oblong, usually rounded above and below, occasionally narrower below, not or slightly constricted at septum; wall dark cinnamon-brown, 1–2.5 μ thick, with a colorless papilla at apex, 4–7 μ high, usually strongly striate; pedicel colorless, as long as spore, or more commonly short, deciduous.

ON SAXIFRAGACEAE:

Heuchera americana L., South Dakota, Wisconsin.
Heuchera bracteata (Torr.) Seringe, Colorado, Wyoming.
Heuchera cylindrica Dougl., Washington.
Heuchera glabella T. & G., Montana, Washington.
Heuchera hispida Pursh, Nebraska, North Dakota, South Dakota.
Heuchera ovalifolia Nutt., Alberta.
Heuchera parvifolia Nutt., Colorado, New Mexico, Utah, Wyoming.
Heuchera rubescens Torr., Utah.
Micranthes californica (Greene) Small (*Saxifraga californica* Greene), California, Oregon.
Micranthes columbiana (Piper) Small (*Saxifraga columbiana* Piper), Idaho.
Micranthes Marshallii (Greene) Small (*Saxifraga Marshallii* Greene), Oregon.
Micranthes nivalis (L.) Small (*Saxifraga nivalis* L.), Greenland.
Micranthes pennsylvanica (L.) Haw. (*Saxifraga pennsylvanica* L.), Indiana, Minnesota.
Micranthes virginiensis (Michx.) Small (*Saxifraga virginiensis* Michx.), California, New Jersey, New York, Ohio, Pennsylvania, West Virginia.
Ozomelis stauropetala (Piper) Rydb. (*Mitella stauropetala* Piper), Idaho, Wyoming.
Ozomelis stenopetala (Piper) Rydb. (*Mitella stenopetala* Piper, *M. trifida* S. Wats., not Graham), Utah.
Pectiantia Breweri (A. Gray) Rydb. (*Mitella Breweri* A. Gray), California.
Saxifraga debilis Engelm., Utah.
Saxifraga rivularis L., Montana; British Columbia.

TYPE LOCALITY: Yonkers, New York, on leaves of *Saxifraga* [*virginiensis*].
DISTRIBUTION: West Virginia to Colorado and central California and northward into arctic regions; also in northern Norway.
ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa 3^2: *pl. 1, f. 7;* Holway, N. Am. Ured. 1: *pl. 18, f. 68a, b;* Ber. Deuts. Bot. Ges. 9: *pl. 3, f. 4–6.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *7;* Barth. N. Am. Ured. *736, 1539;* Brenckle, Fungi Dak. *63;* Clements, Crypt. Form. Colo. *557;* Ellis, N. Am. Fungi *1034, 1465;* Ellis & Ev. Fungi Columb. *1379, 1575, 2143;* Ellis & Ev. N. Am. Fungi *2242;* Garrett, Fungi Utah. *39, 40, 134, 212;* D. Griff. W. Am. Fungi *272;* Sydow, Ured. *1320, 1916.*

33. **Micropuccinia Lithophragmae** (Holway) Arthur & Jackson.

Puccinia Lithophragmae Holway, N. Am. Ured. 1: 51. 1906.

O. Pycnia unknown.

III. Telia chiefly hypophyllous and petiolicolous, round, 0.5–1 mm. across, scattered or more commonly closely gregarious, becoming confluent in groups 2–4 mm. in diameter, elongate on petioles, soon naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 16–20 by 30–44 μ, rounded or obtuse above, rounded or narrowed below, slightly or not constricted at septum; wall uniformly 1.5–2 μ thick with conic hyaline papilla over pores, prominently longitudinally striate-rugose; pedicel colorless, short, deciduous.

ON SAXIFRAGACEAE:

Lithophragma parviflora (Hook.) Nutt. (*Tellima parviflora* Hook.), Utah.
TYPE LOCALITY: Wasatch Mountains, Salt Lake County, Utah, on *Lithophragma parviflora.*
DISTRIBUTION: Known only from the type locality.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 21, f. 75a, b.*
EXSICCATI: Garrett, Fungi Utah. *137.*

34. **Micropuccinia Heterisiae** (H. S. Jackson) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia aspera Dietel & Holway; Arth. Bull. Torrey Club **29**: 230. 1902. Not *P. aspera* Bon. 1869.
Dasyspora aspera Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Heterisiae H. S. Jackson; Arth. Bull. Torrey Club **47**: 471. 1920.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, round, large, 0.5–2 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores somewhat irregularly ellipsoid, oblong or clavate, 16–23 by 32–45 μ, rounded or rarely obtuse above, rounded or narrowed below, not or very slightly constricted at septum; wall dark cinnamon-brown, 1.5–2.5 μ thick, scarcely thickened at apex but pore of upper cell covered by sub-hyaline papilla, closely and irregularly verrucose; pedicel colorless, short, as long as spore, or more commonly deciduous.

ON SAXIFRAGACEAE:

Heterisia Mertensiana (Bong.) Small (*Saxifraga Mertensiana* Bong.), Montana, Washington,
TYPE LOCALITY: Mt. Paddo [Mt. Adams], Washington, on *Saxifraga Mertensiana.*
DISTRIBUTION: Northern Montana to central Washington.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 19, f. 71a, b.*
EXSICCATI: Barth. N. Am. Ured. *619.*

35. **Micropuccinia turrita** (Arth.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia turrita Arth. Bull. Torrey Club **29**: 230. 1902.
Dasyspora turrita Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia amphigenous, roundish, 0.5–1 mm. across, early naked, chestnut-brown, pulverulent, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 20–24 by 36–45 μ, rounded or obtuse above, rounded below, slightly constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, thickened at apex by sub-hyaline umbo to 7 μ, coarsely and irregularly tuberculate, especially at apex, the pore of lower cell variously placed from near septum to near pedicel; pedicel colorless, very short.

ON SAXIFRAGACEAE:

Leptasea austromontana (Wieg.) Small (*Saxifraga austromontana* Small, *S. bronchialis* Pursh), Colorado, Utah.

TYPE LOCALITY: Manitou, Colorado, on *Saxifraga bronchialis*.
DISTRIBUTION: Central Colorado to southeastern Utah.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 20, f. 72a, b.*
EXSICCATI: Garrett, Fungi Utah. *221.*

36. **Micropuccinia Saxifragae-tricuspidatae** (P. Henn.) Arthur & Jackson.

Puccinia Saxifragae-tricuspidatae P. Henn.; Allesch. & Henn. Bibl. Bot. 8^{42a}: 41. 1897.

O. Pycnia unknown.

III. Telia hypophyllous, scattered, or sometimes confluent, round, early naked, pulvinate, golden-brown, ruptured epidermis evident; teliospores broadly ellipsoid, 19–23 by 32–40 μ, rounded or obtuse above, constricted at septum; wall chestnut-brown, thin, not or slightly thickened at apex, finely verrucose appearing smooth; pedicel colorless, long, deciduous.

ON SAXIFRAGACEAE:
Leptasea tricuspidata (Retz) Haw. (*Saxifraga tricuspidata* Retz), Greenland.
TYPE LOCALITY: Karajak-Nunatak, Greenland, on *Saxifraga tricuspidata*.
DISTRIBUTION: Eastern Greenland.

37. **Micropuccinia Jueliana** (Dietel) Arthur & Jackson.

Puccinia Jueliana Dietel, Hedwigia **36**: 298. 1897.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, scattered or occasionally gregarious and confluent, round, 0.5–1 mm. in diameter, tardily naked, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores oblong or oblong-cylindric, 15–18 by 30–42 μ, rounded or obtuse above, rounded or occasionally somewhat narrowed below, strongly constricted at septum; wall light chestnut-brown, 2–2.5 μ thick, thicker above, 5–7 μ, with a broad and somewhat lighter umbo, noticeably rugose when dry, obscurely verrucose-rugose when wet; pedicel colorless, short, deciduous.

ON SAXIFRAGACEAE:
Spatularia Brunoniana (Bong.) Small (*Saxifraga nootkana* Moc.), British Columbia.
TYPE LOCALITY: Röisheim, Norway, on *Saxifraga aizoides*.
DISTRIBUTION: Mountains of British Columbia; also in alpine regions of Europe.
ILLUSTRATION: Beitr. Krypt. Schweiz 2^2: *f. 116.*

38. **Micropuccinia Parnassiae** (Arth.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Parnassiae Arth. Bull. Torrey Club **31**: 3. 1904.
Dasyspora Parnassiae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia amphigenous, scattered or somewhat gregarious, pustular, coalescing, soon naked, pulverulent, chocolate-brown, membranous epidermis conspicuous; teliospores ellipsoid or oblong, occasionally somewhat angular, 16–20 by 30–36 μ, rounded or obtuse at either end, scarcely constricted at septum; wall uniformly 1–2 μ thick, chestnut-brown, minutely verrucose especially on the upper cell, usually with hyaline papilla over the pore, which is apical in upper cell and either at septum or slightly below it in lower cell; pedicel colorless, half length of spore or less, usually deciduous.

ON PARNASSIACEAE:
Parnassia fimbriata Banks, Utah; Alberta, British Columbia.
TYPE LOCALITY: Banff, Alberta, on *Parnassia fimbriata*.
DISTRIBUTION: High altitudes from northern Utah to British Columbia.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 22, f. 77a, b.*
EXSICCATI: Garrett, Fungi Utah. *24;* Sydow, Ured, *1934.*

39. **Micropuccinia Ribis** (DC.) Rostr. Plantep. Haandb. 266. 1902.

Puccinia Ribis DC. Fl. Fr. **2**: 221. 1805.
Puccinia bullata Link, Ges. Nat. Freunde Berlin Mag. **7**: 29. 1815.
Dicaeoma Ribis S. F. Gray, Nat. Arr. Brit. Pl. **1**: 542. 1821.

Puccinia Acerum Link, in Willd. Sp. Pl. 6²: 80. 1825.
Puccinia granulata DeBary; Klotzsch, Herb. Viv. Myc. ed. 2. *499.* 1857; Bot. Zeit. **15**: 174. 1857.
Puccinia pulchella Peck, Bull. Buffalo Soc. Nat. Sci. **1**: 66. 1873.
Puccinia Ribis papillifera Lagerh. Hedwigia **28**: 107. 1889.
Dicaeoma pulchellum Kuntze, Rev. Gen. **3³**: 470. 1898.
Dasyspora Ribis Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia mostly epiphyllous, circinating on yellowish or reddish spots 2–3 mm. in diameter, round or oblong, 0.3–0.8 mm. across, rather early naked, pulverulent, dark chestnut-brown, ruptured epidermis evident; teliospores oblong or narrowly ellipsoid, 13–19 by 26–35 μ, rounded at both ends, not or slightly constricted at septum; wall dark cinnamon-brown, rather thick, 1.5–2.5 μ, thickened into a low semi-hyaline umbo over the pores, 3–5 μ, closely and noticeably verrucose, the pore of upper cell apical, of lower cell usually near pedicel; pedicel colorless, fragile, short.

ON GROSSULARIACEAE:

Ribes glandulosum Grauer (*R. prostratum* L'Hér.), Maine, New York, Vermont, Wisconsin.
Ribes rubrum L., Michigan, Minnesota, Wisconsin.
Ribes triste Pall., Maine.
Ribes vulgare Lam., Minnesota.

TYPE LOCALITY: France, on red currant [*Ribes rubrum*].
DISTRIBUTION: Northern border of the United States from Maine westward to Minnesota; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2²: *f. 112;* Corda, Ic. Fung. **4**: *pl. 5, f. 60;* Holway, N. Am. Ured. **1**: *pl. 22, f. 79a, pl. 23, f. 79b, c;* Ber. Deuts. Bot. Ges. **9**: *pl. 3, f. 16;* Grove, Brit. Rust Fungi *f. 159.*
EXSICCATI: Barth. Fungi Columb. *2674;* Barth. N. Am. Ured. *363;* Thüm. Myc. Univ. *544.*

40. **Micropuccinia Parkerae** (Dietel & Holway) Arthur & Jackson.

Puccinia Parkerae Dietel & Holway; Dietel, Erythea **3**: 78. 1895.

O. Pycnia not known.

III. Telia hypophyllous and petiolicolous, crowded in groups 2–6 mm. in diameter opposite reddish spots, often causing distention of leaf in infected areas, round or oblong, large, 0.5–3 mm. long, rather early naked, pulvinate, brownish-black, ruptured epidermis conspicuous; teliospores oblong or clavate-oblong, 13–16 by 32–53 μ, rounded or oblique above, narrowed below, constricted at septum; wall chestnut-brown above, lighter below, 1.5–2 μ thick, thickened at apex, 5–12 μ, smooth; pedicel colorless, up to twice length of spore.

This species is correlated with *Dicaeoma Grossulariae* (Schum.) Kern, the telial characters of the two species being similar or identical, and the host of the short-cycled form corresponding with the aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON GROSSULARIACEAE:

Ribes lacustre (Pers.) Poir. (*Limnobotrya lacustris* Rydb.), Oregon, Washington; British Columbia.
TYPE LOCALITY: Seattle, Washington, on *Ribes lacustre.*
DISTRIBUTION: Oregon northward into British Columbia.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 22, f. 78.*
EXSICCATI: Barth. N. Am. Ured. *52;* Ellis & Ev. Fungi Columb. *753;* Ellis & Ev. N. Am. Fungi *3242.*

41. **Micropuccinia Sieversiae** (Arth.) Arthur & Jackson.

Puccinia Sieversiae Arth. Bull. Torrey Club **31**: 3. 1904.

O. Pycnia unknown.

III. Telia mostly hypophyllous, scattered, round or oblong, 0.3–1 mm. across, somewhat tardily naked, bullate, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid or ellipsoid-oblong, 16–22 by 30–39 μ, rounded above and below, not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, thickened at apex into a low, semi-hyaline umbo, 4–6 μ, rather obscurely rugose; pedicel colorless, short, fragile.

ON ROSACEAE:

Acomastylis turbinata (Rydb.) Greene (*Geum turbinatum* Rydb., *Sieversia turbinata* Greene), Colorado, Utah.
TYPE LOCALITY: Fish Lake, Uintah Mountains., Utah, on *Sieversia turbinata.*
DISTRIBUTION: Northwestern Utah and adjacent Colorado.
ILLUSTRATION: Holway, N. Am. Ured. **1**. *pl. 23, f. 81a, b.*

42. **Micropuccinia Waldsteiniae** (M. A. Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Waldsteiniae M. A. Curt.; Peck, Ann. Rep. N. Y. State Mus. **25**: 120. 1873.
Dicaeoma Waldsteiniae Kuntze, Rev. Gen. **3**[3]: 471. 1898.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or occasionally crowded in groups 2 mm. in diameter upon somewhat purplish spots, round, 0.2–1 mm. in diameter, early naked, compact, pulvinate, chocolate-brown, ruptured epidermis conspicuous; teliospores clavate or cylindric, 13–18 by 40–55 μ, rounded or obtuse above, narrowed or rounded below, somewhat constricted at septum; wall chestnut-brown at apex, lighter below, thin, 1–1.5 μ, considerably thickened at apex, 5–12 μ, smooth; pedicel cinnamon-brown, up to twice length of spore.

ON ROSACEAE:
Waldsteinia fragarioides (Michx.) Tratt., New York; Ontario.
Waldsteinia idahoensis Piper, Idaho.
TYPE LOCALITY: Fort Edward, New York, on *Waldsteinia fragarioides*.
DISTRIBUTION: Throughout New York, southwestern Ontario, and northern Idaho.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 23, f. 82.*
EXSICCATI: Barth. Fungi Columb. *2972;* Barth. N. Am. Ured. *581;* Ellis, N. Am. Fungi *1050;* Ellis & Ev. Fungi Columb. *1775.*

43. **Micropuccinia Leveillei** (Mont.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Geranii Lév. Ann. Sci. Nat. III. **5**: 270. 1846. Not *P. Geranii* Corda, 1840.
Puccinia Leveillei Mont. in C. Gay, Fl. Chil. **8**: 41. 1852.
Puccinia Geranii-silvatici P. Karst. Not. Sällsk. Faun. Fl. Fenn. **8**: 220. 1869.
Puccinia semireticulata Fuckel, Jahrb. Nass. Ver. Nat. **29–30**: 12. 1875.
Puccinia Fuckelii Körn. Hedwigia **16**: 20. 1877.
Puccinia Leveilleana De-Toni, in Sacc. Syll. Fung. **7**: 696. 1888.
Dicaeoma Geranii-silvatici Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Leveillei Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dasyspora Geranii-silvatici Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, or caulicolous, rarely epiphyllous, small, round, 0.5–0.8 mm. across, gregarious and often confluent in orbicular groups on purplish spots, or in elongate groups 1–3 cm. long on veins and petioles, often resulting in considerable distortion, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 16–22 by 26–34 μ, rounded above, rounded or somewhat narrowed below, not constricted at septum; wall chestnut-brown, 1.5–3 μ thick, not or scarcely thickened above, 3–4 μ, strongly and closely verrucose on upper cell, usually less prominently so on lower cell, the pore of upper cell at apex, of lower cell depressed half way or near pedicel; pedicel colorless, slender, twice length of spore, deciduous, leaving 7–10 μ attached to spore.

ON GERANIACEAE:
Geranium incisum Nutt. (*G. oreganum* Howell), Washington.
Geranium nervosum Rydb., Utah.
Geranium Richardsonii Fisch. & Trautv. (*G. albiflorum* Hook.), Colorado, Utah.
Geranium viscosissimum Fisch. & Mey., Montana.
Geranium sp., Wyoming.
TYPE LOCALITY: Chile, on "*Geranium dissectum,*" now considered to be *G. rotundifolium.*
DISTRIBUTION: Mountains of southern Colorado and Utah, northward to Montana and eastern Washington; also in Europe and South America.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **31**: *pl. 4, f. 1–7, 18–22;* Holway, N. Am. Ured. **1**: *pl. 24, f. 84.*
EXSICCATI: Ellis & Ev. Fungi Columb. *1572;* Ellis & Ev. N. Am. Fungi *2240;* Garrett, Fungi Utah. *88, 101;* Vesterg., Micr. Rar. Sel. *965.*

44. **Micropuccinia Pyrolae** (Cooke) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Pyrolae Cooke, Proc. Portl. Soc. Nat. Hist. 1: 183. 1862.
Puccinia Polygalae Paz.; Rab.-Wint.-Paz. Fungi Eur. *4029.* 1895.
Dicaeoma Pyrolae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Pyrolae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia mostly hypophyllous and caulicolous, circinating on slightly lighter colored

spots, 0.5–2 cm. in diameter, round or oblong, 0.2–1 mm. across, early naked, compact, pulvinate, ruptured epidermis conspicuous; teliospores oblong, ellipsoid, or clavate, 16–26 by 30–42 μ, rounded or obtuse above, rounded or narrowed below, slightly constricted at septum; wall chestnut-brown, rather thick, 1.5–2.5 μ, thicker at apex, 5–9 μ, smooth; pedicel colorless or slightly tinted, about as long as spore.

ON POLYGALACEAE:

Polygala paucifolia Willd., Connecticut, Maine, Michigan, Minnesota, New Hampshire, New York, Wisconsin; Ontario.

TYPE LOCALITY: Cape Elizabeth, Maine, on "*Pyrola*" error for *Polygala paucifolia*.

DISTRIBUTION: Maine and Connecticut westward to Minnesota.

ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 25, f. 89*.

EXSICCATI: Barth. N. Am. Ured. *164, 563;* Ellis N. Am. Fungi *1039;* Ellis & Ev. Fungi Columb. *187;* Seym. & Earle, Econ. Fungi Suppl. *B17;* Shear, N. Y. Fungi *121*.

45. **Micropuccinia Arechavaletae** (Speg.) Arthur & Jackson.

Puccinia Arechavaletae Speg. Anal. Soc. Ci. Argent. **12**: 67. 1881.
Uromyces pervius Speg. Anal. Soc. Ci. Argent. **17**: 94. 1884.
Uromyces aeruginosus Speg. Revista Argent. Hist. Nat. **1**: 20. 1891.
Puccinia Serjaniae Ellis & Ev. Erythea **5**: 6. 1897.
Caeomurus aeruginosus Kuntze, Rev. Gen. **3**[3]: 449. 1898.
Dicaeoma Arechavaletae Kuntze, Rev. Gen. **3**[3]: 467. 1898.

O. Pycnia unknown.

III. Telia mostly hypophyllous, loosely grouped or crowded and circinating on yellowish spots 2–5 mm. across, round, 0.1–0.3 mm. in diameter, early naked, loosely pulvinate, chestnut-brown becoming cinereous from germination, ruptured epidermis inconspicuous; telios ores ellipsoid, 15–26 by 20–35 μ, rounded at both ends, not constricted at septum; wall golden- or chestnut-brown, 1.5–3 μ thick, sometimes thickened up to 7 μ at apex, smooth; pedicel colorless, up to three times as long as spore; mesospores very abundant, sometimes almost entirely replacing teliospores, globoid, ellipsoid, or obovoid, 13–23 by 16–26 μ, rounded above, rounded or narrowed below, the wall golden-brown, 2–3 μ thick, sometimes thickened up to 5 μ at apex, smooth, the pedicel colorless or tinted next to spore, up to 60 μ long.

ON SAPINDACEAE:

Cardiospermum coluteoides H.B.K., Guatemala.
Cardiospermum Corindum L., Florida, Texas; Guatemala; Panama; Porto Rico.
Cardiospermum grandiflora Sw., Costa Rica; Guatemala; Panama; Jamaica.
Cardiospermum Halicacabum L., Florida, Texas; Guerrero, Hidalgo, Jalisco, Morelos; Panama; St. Vincent.
Cardiospermum microcarpum H.B.K., Oaxaca, Vera Cruz; Bahamas; Cuba; Porto Rico; Jamaica; Antigua.
Serjania racemosa Schum., Guerrero, Morelos.

TYPE LOCALITY: Montevideo, Argentina, on *Cardiospermum velutinum*.

DISTRIBUTION: Tropical North America from Florida and Texas southward through the West Indies and Central America; also in South America.

ILLUSTRATIONS: Holway, N. Am. Ured. **1**: *pl. 26, f. 92;* Bih. Sv. Vet.-Akad. Handl. **23 (3)**[10]: *pl. 4, f. 28*.

EXSICCATI: Barth. N. Am. Ured. *123*.

46. **Micropuccinia Mesnieriana** (Thüm.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Mesnieriana Thüm. Myc. Univ. *834*. 1877.
Puccinia digitata Ellis & Hark. Bull. Calif. Acad. **1**: 27. 1884.
Dicaeoma digitatum Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Mesnierianum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dasyspora Mesnieriana Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Coronotelium Mesnierianum Sydow, Ann. Myc. **19**: 174. 1921.

O. Pycnia unknown.

III. Telia mostly hypophyllous, scattered, opposite reddish or brownish spots, round or elliptic, large, 1–4 mm. across, early naked, pulvinate, brownish-black, ruptured epidermis noticeable; teliospores clavate or cylindric, 12–21 by 48–80 μ, with 2–7 digitate projections in a coronate arrangement at apex, rounded or narrowed below, slightly constricted at septum; wall chestnut-brown at apex, lighter below becoming almost colorless in lower cell, 2–3 μ thick, much thickened above, 7–12 μ including projections; pedicel golden- or chestnut-brown, short, up to half length of spore.

This species is correlated with *Dicaeoma Rhamni* (Pers.) Kuntze, the telial characters of the two species being very similar, and the hosts of the short-cycled form corresponding with the aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON RHAMNACEAE:

Rhamnus californica Eschsch., California.
Rhamnus crocea Nutt. (*R. insularis* Greene), California.
Rhamnus crocea illicifolia (Kellogg) Greene, California.

TYPE LOCALITY: Coimbra, Portugal, on *Rhamnus Alaternus*.
DISTRIBUTION: California; also in Europe.
ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa 3[2]: *pl. 2, f. 13;* Holway, N. Am. Ured. 1: *pl. 26, f. 94.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *13a, b;* Barth. Fungi Columb. *4970;* Barth. N. Am. Ured. *1660, 2455;* Ellis, N. Am. Fungi *1466;* Sydow, Ured. *1375.*

47. **Micropuccinia Triumfettae** (Dietel & Holway) Arthur & Jackson.

Puccinia Triumfettae Dietel & Holway; Holway, Bot. Gaz. **24**: 30. 1897.

O. Pycnia unknown.

III. Telia mostly hypophyllous, loosely grouped upon yellowish spots 1–10 mm. across, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, golden- or chocolate-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores ellipsoid, oblong, or obovoid, 15–18 by 25–36 μ, rounded above, rounded or narrowed below, slightly constricted at septum; wall light golden-brown, rather thick, 1.5–2.5 μ, thickened at apex, 3–7 μ, smooth; pedicel colorless, up to three times spore-length.

ON TILIACEAE:

Triumfetta semitriloba Jacq., Morelos.

TYPE LOCALITY: Cuernavaca, Mexico, on *Triumfetta semitriloba*.
DISTRIBUTION: Southern Mexico; also in South America.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 26, f. 95.*

48. **Micropuccinia Malvacearum** (Bertero) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Malvacearum Bertero; Mont. in C. Gay, Fl. Chil. **8**: 43. 1852.
Dicaeoma Malvacearum Kuntze, Rev. Gen. 3[3]: 469. 1898.
Leptopuccinia Malvacearum Rostr. Plantep. Haandb. 268. 1902.
Dasyspora Malvacearum Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous and caulicolous, round, 0.2–1.5 mm. across, scattered over large areas, pulvinate, compact, early naked, at first yellowish-brown, later light chestnut-brown, becoming cinereous by germination, ruptured epidermis not conspicuous except about caulicolous sori; teliospores fusiform or oblong-fusiform, 16–26 by 40–70 μ, acute or obtuse at apex, usually much narrowed below, slightly or not constricted at septum; wall variable in thickness, 1.5–4 μ, smooth, cinnamon-brown, somewhat thickened at apex, 5–10 μ; pedicel once and a half to twice length of spore, colorless, firm, persistent.

ON MALVACEAE:

Althaea ficifolia (L.) Cav., Colorado, New York, Oregon; Ontario.
Althaea rosea (L.) Cav., California, Colorado, Delaware, Illinois, Indiana, Maine, Massachusetts, Michigan, Mississippi, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin; Ontario.
Lavatera arborea L., California.
Lavatera assurgentiflora Kellogg, California.
Lavatera cretica L. (*L. sylvestris* Brot.), California.
Lavatera maritima Gouan, California.
Lavatera plebeia Sims, California.
Malva borealis Wallm., California.
Malva moschata L., California; Ontario.
Malva oxyloba Boiss., California.
Malva parviflora L., California.
Malva rotundifolia L., Colorado, Connecticut, Delaware, Indiana, Michigan, New Jersey, New York, Oregon, Pennsylvania, Utah, Virginia, Washington, West Virginia, Wisconsin; Ontario.
Malva sylvestris L., California, Colorado, Oregon, West Virginia.
Malva verticillata L. (*M. crispa* L.), California.

Malvastrum corchorifolium (Desv.) Britton, Jamaica.
Malvastrum coromandelianum (L.) Garcke (*M. americanum* Torr., *M. tricuspidatum* A. Gray), Morelos; Cuba; Jamaica; Haïti.
Sida spinosa L., Guatemala.
Sidalcea diploscypha (T. & G.) A. Gray, California.

TYPE LOCALITY: Chile, on *Malvaceae* [*Althaea officinalis*].

DISTRIBUTION: Southeastern Canada, and nearly throughout the United States, southward to southern Mexico and through the West Indies; also nearly throughout the world where hollyhocks are grown.

ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**: *f. 227;* Briosi & Cavara, Funghi Parass. *38, f. 1–3;* Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 3, f. 15a, b;* Corda, Ic. Fung. 6: *pl. 1, f. 12;* E. & P. Nat. Pfl. **1**[1]**: *f. 45a, b;* Holway, N. Am. Ured. **1**: *pl. 28, f. 99a, b, pl. 29, f. 99c;* Krypt.-fl. Brand. Pilze **3**: *f. B142;* McAlpine, Rusts Austr. *pl. 12, f. 99, 100, pl. 15, f. 123–130, pl. F, f. 28;* Phytopathology **1**: *pl. 12–14;* Grove, Brit. Rust Fungi *f. 154.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *15a, c;* Barth. Fungi Columq. *2361, 2457, 2458, 2767, 2963, 3258, 3559, 3665, 3666, 3947, 3948, 4463, 4758, 4759, 4856, 5065;* Barth. N. Am. Ured. *154, 245, 553, 647, 948, 1162, 1559, 1854, 1952, 2047, 2453, 2551, 2628;* Ellis & Ev. Fungi Columb. *181a, b, 181 (b), 1766;* Garrett, Fungi Utah *105, 165;* Kellerm. Ohio Fungi *31;* Rel. Farl. *260;* Seym. & Earle, Econ. Fungi *1, 267.*

49. **Micropuccinia Sherardiana** (Körn.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Sherardiana Körn. Hedwigia **16**: 19. 1877.
Puccinia Malvastri Peck, Bull. Torrey Club **12**: 35. 1885.
Puccinia Sphaeralceae Ellis & Ev. Am. Nat. **31**: 428. 1897.
Dicaeoma Malvastri Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Sherardiana Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Sherardiana Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia amphigenous, few in groups surrounded by telia, or entirely wanting, noticeable, honey-yellow turning to dark-brown, globoid, 95–110 μ in diameter; ostiolar filaments forming a column 80–110 μ high.

III. Telia hypophyllous or caulicolous, round, 0.5–1 mm. in diameter, becoming confluent, and often covering considerable areas, firm, pulvinate, early naked, blackish-brown, becoming cinereous from germination, ruptured epidermis not conspicuous; teliospores ellipsoid, oblong, or obovate, 20–28 by 38–75 μ, rounded or obtuse above, rounded or narrowed below, not or slightly constricted at septum; wall golden- or light cinnamon-brown, 2–4 μ thick, thickened above, 5–10 μ, smooth; pedicel colorless, firm, persistent, up to 200 μ long.

This species is correlated with the ~~hetero~~autoecious *Allodus graminella* (Speg.) Arth. and the ~~aut~~oecious *Allodus interveniens* (Peck) Bethel, the morphological characters of like stages in the three species being similar or identical, and there being a significant correspondence in hosts. This agreement doubtless indicates a common origin for the three species.

ON MALVACEAE:

Althaea rosea (L.) Cav., California.
Sidalcea oregana (Nutt.) A. Gray, Colorado, Washington.
Sidalcea spicata Greene, California.
Sidalcea virgata Howell, Oregon.
Sphaeralcea ambigua A. Gray, Nevada.
Sphaeralcea angustifolia (Cav.) G. Don, New Mexico, Texas; Coahuila, Hidalgo, Mexico (state).
Sphaeralcea arcuata (Greene) Arth. (*Malvastrum arcuatum* B. L. Robinson), California.
Sphaeralcea arenaria Wooton & Standley, New Mexico, Texas.
Shpaeralcea arizonica A. Heller, Utah.
Sphaeralcea coccinea (Nutt.) Rydb. (*Malvastrum coccineum* A. Gray), Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Wyoming; Alberta, Saskatchewan.
Sphaeralcea cuspidata (A. Gray) Britton, Arizona, Colorado.
Sphaeralcea dissecta (Nutt.) Rydb. (*Malvastrum dissectum* A. Nelson, *M. dissectum Cockerellii* A. Nelson), Colorado, Utah.
Sphaeralcea elata (Baker f.) Rydb. (*Malvastrum elatum* A. Nelson), Colorado, New Mexico.
Sphaeralcea fasciculata (Nutt.) Arth. (*Malvastrum fasciculatum* Greene, *M. Thurberi* A. Gray, *M. splendidum* Kellogg), California.
Sphaeralcea Fendleri A. Gray, Arizona, New Mexico.
Sphaeralcea incana Torr., New Mexico.
Sphaeralcea lobata Wooton, New Mexico, Texas.
Sphaeralcea marginata York, Arizona, Colorado, New Mexico, Utah.
Sphaeralcea Munroana (Dougl.) Spach (*Malvastrum Munroanum* A. Gray), Idaho, Utah, Washington.
Sphaeralcea subrhomboidea Rydb., Utah.

TYPE LOCALITY: Armenia, on *Malva Sherardiana.*

DISTRIBUTION: Semi-arid plains and mountains from Alberta and North Dakota southward through Mexico; also in South America and Asia.

ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 27, f. 98a–c, pl. 28, f. 98d–g.*
EXSICCATI: Barth. Fungi Columb. *2467, 3370, 3768;* Barth. N. Am. Ured. *367, 568, 967, 1172, 1174, 1270, 1470, 1775, 2469, 2633;* Brenckle, Fungi Dak. *66;* Carleton, Ured. Am. *2;* Clements, Crypt. Form. Colo. *324;* Ellis & Ev. Fungi Columb. *256, 1182;* Ellis & Ev. N. Am. Fungi *3478;* Garrett, Fungi Utah. *168, 222;* D. Griff. W. Am. Fungi *24;* Seym. & Earle, Econ. Fungi Suppl. *B16;* Sydow, Ured. *775, 1276, 2078, 2277.*

50. **Micropuccinia Sidalceae** (Holway) Arthur & Jackson.

Puccinia Sidalceae Holway, N. Am. Ured. 1: 67. 1907.

O. Pycnia unknown.

III. Telia hypophyllous and petiolicolous, round, 0.5–1 mm. across, or elongate to 2 cm. when petiolicolous, scattered, or more or less circinate in small groups, firm, pulvinate, tardily naked, at first cinnamon-brown, becoming blackish, ruptured epidermis persistent and conspicuous; teliospores ellipsoid or oblong, variable in size, 23–32 by 38–48 μ, rounded above and below, not constricted at septum; wall cinnamon- or chestnut-brown, 3–5 μ thick, becoming gradually thicker toward apex up to 8 μ, smooth; pedicel fragile, slender, twice to thrice length of spore, usually broken away, colorless.

ON MALVACEAE:
Sidalcea glaucescens Greene, California.
Sidalcea malvaeflora (Moc. & Sessé) A. Gray, California.
Sidalcea oregana (Nutt.) A. Gray, California, Oregon.
Sidalcea spicata Greene, California, Oregon.
TYPE LOCALITY: Klamath County, Oregon, on *Sidalcea oregana*.
DISTRIBUTION: Southern Oregon to central California.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 29, f. 100.*
EXSICCATI: Barth. N. Am. Ured. *2470;* Sydow, Ured. *1782.*

51. **Micropuccinia heterospora** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia heterospora Berk. & Curt. Jour. Linn. Soc. **10**: 356. 1868.
Uromyces pulcherrimus Berk. & Curt. Grevillea **3**: 56. 1874.
Uromyces Thwaitesii Berk. & Br. Jour. Linn. Soc. **14**: 92. 1875.
Uromyces Sidae Thüm. Rev. Myc. **1**: 10. 1879.
Uromyces pictus Thüm. Rev. Myc. **1**: 10. 1879.
Uromyces Malvacearum Speg. Anal. Soc. Ci. Argent. **12**: 72. 1881.
Puccinia Thwaitesii Wint. Hedwigia **22**: 130. 1883.
Uromyces malvicola Speg. Anal. Soc. Ci. Argent. **17**: 94. 1884.
Puccinia heterospora pulcherrima Lagerh. Tromsö Mus. Aarsh. **17**: 61. 1895.
Caeomurus Malvacearum Kuntze, Rev. Gen. **3³**: 450. 1898.
Caeomurus malvicola Kuntze, Rev. Gen. **3³**: 450. 1898.
Caeomurus pictus Kuntze, Rev. Gen. **3³**: 450. 1898.
Caeomurus Sidae Kuntze, Rev. Gen. **3³**: 450. 1898.
Dicaeoma pulcherrimum Kuntze, Rev. Gen. **3³**: 467. 1898.
Dicaeoma Thwaitesii Kuntze, Rev. Gen. **3³**: 470. 1898.
Uromyces Pavoniae Arth. Bull. Torrey Club **31**: 1. 1904.
Telospora Pavoniae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora heterospora Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia chiefly hypophyllous, small, 0.2–0.5 mm. across, scattered, or more commonly gregarious, and occasionally confluent in more or less circular groups of few to many sori on yellowish spots reaching 1.5 cm. in diameter, early naked, firm, pulvinate, blackish-brown, central sori occasionally cinereous from germination, ruptured epidermis not conspicuous; teliospores with septum few, or entirely wanting in some collections, ellipsoid or globoid, 16–28 by 18–36 μ, rounded above and below, not constricted at septum, which is often oblique; wall chestnut-brown, 2–2.5 μ thick, thickened at apex or opposite pedicel 5–7 μ, smooth; pedicel colorless, firm, once to twice length of spore, often attached laterally, frequently at septum; mesospores numerous, usually predominating, often to exclusion of two-celled teliospores, globoid or obovoid, 16–24 by 18–32 μ, rounded above, rounded or narrowed below, the wall 1.5–3 μ thick, thickened above, 5–7μ, chestnut-brown, smooth, the pedicel colorless, firm, two to five times length of spore.

This species is correlated with *Nigredo Epicampis* (Dietel & Holway) Arth. and *Dicaeoma hibisciatum* (Schw.) Arth., the telial characters of the three species bearing a very remarkable similarity, and the hosts of the short-cycled form corresponding with the aecial hosts of the *Dicaeoma*, those of the *Ni redo* not being positively known. This agreement doubtless indicates a common origin for the three species.

ON MALVACEAE:

Abutilon abutiloides (Jacq.) Garcke (*A. Jacquinii* G. Don, *A. lignosum* Rich. not G. Don), Jalisco, Zacatecas; Cuba.
Abutilon Abutilon (L.) Rusby (*A. Avicennae* Gaertn., *A. Theophrasti* Medic.), District of Columbia, Kansas, Missouri, Nebraska.
Abutilon Berlandieri A. Gray, Hidalgo.
Abutilon discissum (Bertero) Schlecht., Guatemala.
Abutilon Hemsleyanum Rose (*A. sidoides* Hemsl. not Dalz. & Gibs.), Jalisco, San Luis Potosí.
Abutilon hirtum (Lam.) Sweet, Puebla; Cuba; Jamaica; St. Croix; Porto Rico.
Abutilon holosericeum Scheele, Texas.
Abutilon Holwayi Rose, Oaxaca.
Abutilon incanum (Link) Sweet, Arizona, Texas; Sonora.
Abutilon indicum (L.) Sweet, Cuba; Jamaica; Barbados.
Abutilon parvulum A. Gray, Arizona.
Abutilon pauciflorum St.-Hil., Jamaica.
Abutilon permolle (Willd.) Sweet, Cuba.
Abutilon texense T. & G., Texas.
Abutilon sp., Morelos.
Anoda acerifolia Zucc., Morelos, Oaxaca, Veracruz.
Anoda hastata Cav., Aguascalientes, Hidalgo, Jalisco, Michoacan, Morelos, Oaxaca; Cuba.
Anoda lavateroides Medic., Jalisco, Yucatan.
Gaya occidentalis (L.) Sweet, Cuba, Santo Domingo.
Gayoides crispum (L.) Small (*Abutilon crispum* Sweet), Arizona, Florida; Bahamas.
Gayoides imberbe (Griseb.) Small (*Abutilon imberbe* G. Don), Florida.
Malache scabra B. Vogel (*Pavonia racemosa* Sw.), Jamaica, Panama; Porto Rico.
Malva sylvestris L., Kansas.
Malvastrum coromandelianum (L.) Garcke (*M. americanum* Torr., *M. tricuspidatum* A. Gray), Texas.
Malvaviscus arboreus Cav., Costa Rica; Guatemala.
Periptera Periptera (Sims) Rose (*Anoda incarnata* H.B.K. not Spreng.), Jalisco.
Sida aucta Burm., Haïti.
Sida cordifolia L., Guatemala.
Sida glutinosa Commerson, Cuba; Jamaica; Porto Rico.
Sida hastata St.-Hil., Texas.
Sida hederifolia Cav., Porto Rico.
Sida Holwayi Baker & Rose, Morelos.
Sida humilis Cav., Porto Rico; St. Thomas.
Sida physocalyx A. Gray, Arizona, Texas.
Sida procumbens Sw., Cuba; Mona Island; Porto Rico.
Sida salviaefolia Presl, Sinaloa.
Sida spinosa L., Georgia, Illinois, Indiana, Kentucky, Louisiana, Mississippi; Cuba; Porto Rico.
Sida supina L'Hér., Porto Rico; St. Thomas.
Sida texana (T. & G.) Small (*S. Elliottii texana* T. & G., *S. Lindheimeri* Engelm. & Gray), Texas.
Sida urens L., Cuba; Jamaica; Porto Rico.
Sida sp., Jalisco.
Wissadula amplissima (L.) R. E. Fries, Texas.
Wissadula Fadyenii R. E. Fries, Jamaica.
Wissadula periplocifolia (L.) Thwaites (*Abutilon periplocifolium* G. Don), Texas; Cuba; Jamaica; Porto Rico; St. Croix.
Wissadula rostrata (Schum. & Thonn.) Planch., Colima.

TYPE LOCALITY: Cuba, on "leaves apparently of some malvaceous plant."

DISTRIBUTION: Nevada to southern Nebraska and District of Columbia, southward through Central America and the West Indies; also in South America, Asia, Africa, Hawaii, and the Philippines.

ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **9**: *pl. 9, f. 1–16;* Holway, N. Am. Ured. **1**: *pl. 27, f. 97;* Jour. Myc. **7**: *pl. 10, f. 1–5;* McAlpine, Rusts Austr. *pl. 12, f. 101;* Bot. Gaz. **28**: 419, *f. 1.*

EXSICCATI: Barth. N. Am. Ured. *39, 148, 240, 345, 1157, 1158, 1655, 2447;* Barth. Fungi Columb. *2358, 2453, 2454, 4667;* Carleton, Ured. Am. *48;* Ellis & Ev. Fungi Columb. *550, 1455;* Ellis & Ev. N. Am. Fungi *2413;* Kellerm. Fungi Sel. Guat. *6;* Pringle, Mex. Fungi *1, 2;* Seym. & Earle, Econ. Fungi *269, 269a;* Sydow, Ured. *367, 428, 2029, 2067.*

52. **Micropuccinia lobata** (Berk. & Curt.) Arthur & Jackson.

Puccinia lobata Berk. & Curt. Grevillea **3**: 54. 1874.
Dicaeoma lobatum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Puccinia Streptanthi Höhnel, Sitz.-ber. Akad. Wien **118**: 1461. 1909.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, rarely epiphyllous, small, round, 0.3–0.8 mm. across, crowded in more or less orbicular groups 1–10 mm. across, or occasionally scattered singly or in groups of two or more sori, compact, early naked, blackish, becoming cinereous from germination of central sori, ruptured epidermis not conspicuous; teliospores broadly ellipsoid, oblong or obovate, 16–22 by 30–45 μ, rounded above, rounded or occasionally narrowed

below, not constricted at septum; wall golden- or chestnut-brown, usually thick, 1.5–3.5 μ, thickened above, 5–10 μ, often breaking into few irregular points in germinating, smooth; pedicel colorless, 75–120 μ long, or shorter.

ON MALVACEAE:

Althaea rosea (L.) Cav., New Mexico; Mexico (state).
Disella hederacea (Dougl.) Greene (*Sida hederacea* Torr.), Arizona, California, New Mexico, Texas, Utah.
Disella lepidota (A. Gray) Greene (*Sida lepidota* A. Gray), New Mexico, Texas.
Sphaeralcea Orcuttii Rose, California.
Sphaeralcea sp., Arizona.

TYPE LOCALITY: Texas, on *Sida lepidota*.
DISTRIBUTION: Western Texas to central California, and southward to southern Mexico.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 27, f. 96a, b.*
EXSICCATI: Barth. N. Am. Ured. *2451;* Garrett, Fungi Utah. *164.*

53. **Micropuccinia Anodae** (Sydow) Arthur & Jackson.

Puccinia Anodae Sydow, Monog. Ured. 1: 475. 1903.

O. Pycnia unknown.

III. Telia hypophyllous, small, round, 0.5–0.8 mm. across, scattered, or gregarious and confluent in small groups 1–2 mm. across, early naked, pulvinate, cinnamon- or chestnut-brown, becoming cinereous from germination, ruptured epidermis not conspicuous; teliospores ellipsoid or obovate, 18–22 by 32–40 μ, rounded above, rounded or narrowed below, not constricted at septum; wall golden-brown, 2–3 μ thick, thickened above, 7–9 μ, smooth; pedicel colorless, persistent, as long as spore.

ON MALVACEAE:

Anoda acerifolia DC., Veracruz.
Anoda hastata Cav., Costa Rica; Guatemala.

TYPE LOCALITY: San Miguel Uspantan, Guatemala, on *Anoda hastata*.
DISTRIBUTION: Southern Mexico through Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 28, f. 391.*
EXSICCATI: Sydow, Ured. *2609.*

54. **Micropuccinia exilis** (Sydow) Arthur & Jackson.

Puccinia exilis Sydow, Monog. Ured. 1: 481. 1903.

O. Pycnia unknown.

III. Telia hypophyllous, small, 0.5–0.8 mm. in diameter, scattered, or in gregarious and confluent groups 1–3 mm. across, compact, pulvinate, cinnamon-brown, becoming cinereous from germination; teliospores oblong or oblong-clavate, 13–16 by 26–35 μ, rounnded above, rounded or narrowed below, not or slightly constricted at septum; wall yellowish, thin, 1–2 μ, not or slightly thickened above, 3–4 μ, the thickening disappearing upon germination, smooth; pedicel colorless, fragile, twice to thrice length of spore.

ON MALVACEAE:

Pavonia rosea Schlecht., Guatemala.

TYPE LOCALITY: Brazil, on *Pavonia leucantha*.
DISTRIBUTION: Quirigua, Guatemala; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 29, f. 396.*

55. **Micropuccinia filopes** (Arth. & Holway) Arthur & Jackson.

Puccinia filopes Arth. & Holway; Arth. Mycologia 10: 131. 1918.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, crowded or confluent in circular areas 2–5 mm. across, on larger discolored spots, round, 0.1–0.3 mm. in diameter, early naked, pulvinate, golden-brown becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong-obovoid, 13–16 by 30–40 μ, rounded above, somewhat narrowed below, slightly constricted at septum; wall pale golden-brown, sometimes lighter below, 1–1.5 μ thick, slightly or not thickened at apex, smooth; pedicel colorless, once to twice length of spore, slender, 7–9 μ in diameter next to spore, tapering downward.

ON STERCULIACEAE:
Buettneria carthaginensis Jacq., Costa Rica.
Buettneria lateralis Presl, Guatemala.
Buettneria sp., Panama.
TYPE LOCALITY: Escuintla, Guatemala, on *Buettneria lateralis*.
DISTRIBUTION: Central America.

56. **Micropuccinia hiascens** (Arth.) Arthur & Jackson.

Puccinia aucta Arth. & Holway; Arth. Am. Jour. Bot. 5: 475. 1918. Not *P. aucta* Berk. & Müll., 1872.
Puccinia hiascens Arth. Bull. Torrey Club 46: 471. 1920.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in small mostly confluent groups 0.5–2 mm. across, on somewhat larger purple spots, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, chocolate-brown, ruptured epidermis inconspicuous; teliospores oblong, 10–15 by 32–42 μ, rounded or obtuse at both ends, or often narrowed below, somewhat constricted at septum; wall light chestnut-brown or lighter after germination, 1.5–2 μ thick, much thickened above, 3–10 μ, smooth; pedicel light-brown or colorless, once to twice length of spore or shorter, persistent.

ON DILLENIACEAE:
Saurauja Conzattii Busc., Guatemala.
Saurauja Smithiana Busc., Guatemala.
TYPE LOCALITY: Road between Colomba and Quezaltenango, Guatemala, on *Saurauja Smithiana*.
DISTRIBUTION: Guatemala.

57. **Micropuccinia Fergussoni** (Berk. & Br.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Fergussoni Berk. & Br. Ann. Nat. Hist. IV. **15**: 35. Ja 1875.
Puccinia nidificans Magn. Hedwigia **14**: 20. F 1875.
Dicaeoma Fergussoni Kuntze, Rev. Gen. 3³: 468. 1898.
Dasyspora Fergussoni Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous and petiolicolous on yellowish spots, small, 0.2–0.5 mm. across, round, closely gregarious in more or less circular groups 0.2–1 cm. across, somewhat tardily naked, chestnut-brown, ruptured epidermis noticeable; teliospores somewhat irregularly ellipsoid, oblong, or clavate, 13–18 by 26–42 μ, rounded or obtuse above, rounded or more commonly narrowed below, slightly or not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, thicker above, 3–7 μ, smooth; pedicel short, deciduous.

ON VIOLACEAE:
Viola Langsdorfii Fisch., British Columbia.
Viola Macloskeyi F. E. Lloyd, British Columbia.
Viola nephrophylla Greene (*V. cognata* Greene), Utah; British Columbia.
Viola palustris L., Alaska, Colorado, Montana.
TYPE LOCALITY: New Pitsligo, Scotland, on *Viola palustris*.
DISTRIBUTION: High mountains of northern Colorado and Utah, northwestward to southeastern Alaska; also in Europe.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 29, f. 102;* Grove, Brit. Rust Fungi *f. 151.*
EXSICCATI: Barth. N. Am. Ured. *1542;* Garrett, Fungi Utah. *53.*

58. **Micropuccinia ornatula** (Holway) Arthur & Jackson.

Puccinia ornatula Holway, N. Am. Ured. 1: 67. 1907.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, occasionally epiphyllous, small, round, 0.2–0.5 mm. across, usually gregarious but rarely coalescing, early naked, punctiform, becoming pulverulent, chestnut-brown, surrounding epidermis persistent and conspicuous; teliospores angularly ellipsoid, fusiform, or oblong, 16–22 by 26–44 μ, rounded or obtuse above, rounded or narrowed below, not constricted at septum; wall dark cinnamon-brown, uniformly thin, 1–2 μ, smooth, except for two to four obscure longitudinal lines of fine papillae, the pores covered by an abrupt hyaline umbo, that of upper cell at apex or at one side, that of lower cell at septum or depressed half way; pedicel colorless, fragile, as long as spore, or more commonly deciduous.

ON VIOLACEAE:
Viola canadensis L., British Columbia.
Viola glabella Nutt., British Columbia.
Viola rugulosa Greene, British Columbia.
TYPE LOCALITY: Alpine meadow, Glacier, British Columbia, on *Viola canadensis*.
DISTRIBUTION: Vicinity of Glacier, British Columbia.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 29, f. 101a, b.*

59. **Micropuccinia canadensis** (Arth.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia canadensis Arth. Bull. Torrey Club **31**: 2. 1904.
Dasyspora canadensis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous, round, 0.5–1 mm. across, gregarious and frequently confluent, soon naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores narrowly oblong or oblong-linear, 12–16 by 30–56 μ, obtuse at both ends, noticeably constricted at septum; wall cinnamon-brown, 1–2 μ thick, slightly thickened above, 3–6 μ, minutely verrucose, the tubercles in irregular longitudinal rows; pedicel colorless, delicate, short, or as long as spore.

ON VIOLACEAE:
Viola orbiculata Geyer, Alberta, British Columbia.
TYPE LOCALITY: Laggan, Alberta, on *Viola orbiculata*.
DISTRIBUTION: High mountains of western Canada.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 29, f. 103.*

60. **Micropuccinia Cupheae** (Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Cupheae Holway, Ann. Myc. **2**: 393. 1904.
Puccinia jaliscensis Holway, Ann. Myc. **2**: 393. 1904.
Dasyspora jaliscensis Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, crowded on reddish or brownish spots 1.5–6 mm. across, round, 0.1–0.8 mm. in diameter, early naked, pulvinate, dark chestnut-brown, ruptured epidermis rather inconspicuous; teliospores cylindric, clavate, or ellipsoid, variable in size, 15–23 by 32–74 μ, rounded or obtuse above, rounded or narrowed below, slightly constricted at septum; wall golden- or chestnut-brown above, lighter below, 1–2 μ thick, thickened at apex, 5–10 μ, smooth; pedicel slightly tinted or colorless, about length of spore.

ON LYTHRACEAE:
Cuphea aequipetala Cav., Mexico (state).
Cuphea cyanaea Moc. & Sessé, Oaxaca.
Cuphea Hookeriana Walp., Jalisco; Guatemala.
Cuphea nitidula H.B.K., Oaxaca.
Cuphea procumbens Cav., Mexico (state).
Cuphea squamuligera Koehne, Morelos.
TYPE LOCALITY: Valley of Mexico, Mexico, on *Cuphea* [*aequipetala*].
DISTRIBUTION: Southern Mexico and Guatemala.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 32, f. 106, 107.*
EXSICCATI: Barth. Fungi Columb. *4956;* Barth. N. Am. Ured. *430;* Sydow, Ured. *1877.*

61. **Micropuccinia Circaeae** (Pers.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Circaeae Pers. Neues Mag. Bot. **1**: 119. 1794.
Dicaeoma Circaeae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dasyspora Circaeae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Leptopuccinia Circaeae Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia mostly hypophyllous or caulicolous, crowded, sometimes circinating on reddish or yellowish spots 2–5 mm. across, round, 0.1–0.3 mm. in diameter, early naked, pulvinate, sometimes pulverulent on stems, yellowish or dark cinnamon-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores ellipsoid, oblong, or fusiform-oblong, 10–16 by 24–39 μ, rounded or narrowed above and below, constricted at septum;

wall golden-brown or pale-yellowish, sometimes almost colorless, 1–1.5 μ thick, thickened at apex, 3–9 μ, smooth; pedicel colorless, up to 40 μ long.

ON ONAGRACEAE:

Circaea alpina L., Alaska, Colorado, Michigan, Minnesota, Montana, New Hampshire, New York, Pennsylvania, West Virginia, Wisconsin; Newfoundland; Nova Scotia, Ontario.

Circaea lutetiana L. (*C. canadensis* Muhl., *C. latifolia* Hill), Connecticut, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Ohio, Pennsylvania, North Carolina, North Dakota, Virginia, West Virginia, Wisconsin; Nova Scotia, Ontario, Quebec.

Circaea pacifica Asch. & Magn., Alaska, California, Colorado, Idaho, Montana, Oregon, Utah, Washington; British Columbia.

TYPE LOCALITY: Europe, on *Circaea lutetiana*.

DISTRIBUTION: North Carolina to northern Mississippi and Utah, and northward to Alaska and Newfoundland; also in Europe and southern Asia.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 2a, b;* Corda, Ic. Fung. **4**: *pl. 3, f. 34;* Holway, N. Am. Ured. **1**: *pl. 36, f. 118a, b.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *2a, b;* Barth. Fungi Columb. *2352, 2659, 3252, 4259, 4456, 4845, 5052;* Barth. N. Am. Ured. *130, 336, 830, 933, 1142, 1749, 2235;* Brenckle, Fungi Dak. *487;* Ellis, N. Am. Fungi *250, 1030;* Ellis & Ev. Fungi Columb. *483, 1286;* Garrett, Fungi Utah. *229;* Kellerm. Ohio Fungi *29;* Rel. Farl. *248;* Sydow, Ured. *1015, 1118;* Thüm. Myc. Univ. *1330.*

62. **Micropuccinia Fuchsiae** (Sydow & Holway) Arthur & Jackson.

Puccinia Fuchsiae Sydow & Holway; Sydow, Ann. Myc. **4**: 30. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, crowded opposite reddish spots 1–4 mm. in diameter, round or oblong, 0.2–0.8 mm. across, early naked, pulvinate, yellowish or dark cinnamon-brown becoming cinereous from germination, ruptured epidermis rather inconspicuous; teliospores oblong, ellipsoid, or clavate, 13–18 by 34–45 μ, rounded above, rounded or narrowed below, somewhat constricted at septum; wall pale-yellow or pale golden-brown, 1–1.5 μ thick, thickened at apex, 3–7 μ, smooth; pedicel colorless, one half to once length of spore.

ON ONAGRACEAE:

Fuchsia microphylla H.B.K., Guatemala.

Fuchsia thymifolia H.B.K., Mexico (state).

Lopezia hirsuta Jacq., Costa Rica; Guatemala; Panama.

TYPE LOCALITY: Amecameca, Mexico, on *Fuchsia thymifolia.*

DISTRIBUTION: Southern Mexico and Central America.

ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 36, f. 119.*

EXSICCATI: Sydow, Ured. *1976.*

63. **Micropuccinia gigantea** (P. Karst.) Arthur & Jackson.

Puccinia gigantea P. Karst. Bidr. Finl. Nat. Folk **31**: 42. 1879.
Dicaeoma giganteum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Puccinia annulata Ellis & Ev. Bull. Torrey Club **27**: 60. 1900.
Puccinia pileata Mayor, Bull. Soc. Neuch. Sci. Nat. **29**: 67. 1901.

O. Pycnia unknown.

III. Telia hypophyllous or caulicolous, crowded opposite reddish or brownish, slightly hypertrophied spots 1–3 mm. in diameter, or up to 13 mm. on stems, round or oblong, 0.5–1.5 mm. across, early naked, pulvinate, dark chocolate-brown, ruptured epidermis conspicuous; teliospores cylindric or cylindric-clavate, 10–17 by 32–58 μ, rounded or acute above, sometimes slightly narrowed below; wall golden-brown or chestnut-brown above, 1–1.5 μ thick, considerably thickened at apex, 6–12 μ, smooth; pedicel colorless, up to 50 μ long.

ON ONAGRACEAE:

Chamenerion spicatum (Lam.) S. F. Gray (*C. angustifolium* Scop., *Epilobium angustifolium* β L.), Montana; Alberta.

TYPE LOCALITY: Jakobstad, Lapland, on *Epilobium angustifolium.*

DISTRIBUTION: Mountains of western Montana to southern Alberta; also in Europe.

64. **Micropuccinia Epilobii** (DC.) Rostr. Medd. Grønland 30: 114. 1904.

Puccinia Epilobii DC. Fl. Fr. 6: 61. 1815.
Dicaeoma Epilobii Kuntze, Rev. Gen. 3³: 468. 1898.
Dasyspora Epilobii Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, scattered over the entire lower surface of leaf, arising from a diffused mycelium, ellipsoid or oblong, 0.5–1 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; teliospores ellipsoid or oblong, 18–23 by 30–42 μ, rounded at both ends, deeply constricted at septum; wall yellowish-brown, rather thick, 1.5–2.5 μ, sometimes up to 3 μ over pores, minutely and closely verrucose; pedicel colorless or pale-yellow, fragile, up to 25 μ long; mesospores few, ellipsoid, 20–23 by 24–35 μ.

This species is correlated with *Nigredo plumbaria* (Peck) Arth. and *Dicaeoma Epilobii-tetragoni* (DC.) Arth., both autoecious species, there being close similarity in the morphological characters of the telia in the three species, and a significant correspondence in the hosts. This agreement doubtless indicates a common origin for the three species.

ON ONAGRACEAE:

Epilobium alpinum L., Wyoming; Quebec.
Epilobium Hornemannii Reichenb. (*E. alsinifolium* Blytt), Greenland.

TYPE LOCALITY: In vicinity of Quériqut, Pyrenees, France, on *Epilobium origanifolium*.
DISTRIBUTION: Mountains of northwestern Wyoming, and from the mouth of the St. Lawrence River to western Greenland; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2²: *f. 120;* Holway, N. Am. Ured. 1: *pl. 33, f. 110a, b;* Krypt.-fl. Brand. Pilze 3: *f. B19;* Grove, Brit. Rust Fungi *f. 148*.

65. **Micropuccinia scandica** (Johans.) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia scandica Johans. Bot. Notiser 1886: 175. 1886.
Dicaeoma scandicum Kuntze, Rev. Gen. 3³: 470. 1898.
Dasyspora scandica Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, covering the leaf, crowded, round, 0.3–0.8 mm. in diameter, early naked, pulverulent, somewhat pulvinate, dark cinnamon-brown, ruptured epidermis evident; teliospores oblong or clavate, 13–17 by 27–38 μ, rounded above, rounded or narrowed below, moderately or deeply constricted at septum; wall cinnamon-brown, 1–2 μ thick, thickened into a lighter umbo at apex, 3–5 μ, closely and finely verrucose; pedicel colorless, fragile, up to 40 μ long.

ON ONAGRACEAE:

Epilobium clavatum Trel., Utah, Washington.
Epilobium sp., British Columbia.

TYPE LOCALITY: Jemtland, Sweden, on *Epilobium anagallidifolium*.
DISTRIBUTION: From central Utah northwestward into Canada; also in Sweden.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 33, f. 111.*
EXSICCATI: Garrett, Fungi Utah. *84, 140;* Sydow, Ured. *1940, 2038*.

66. **Micropuccinia Araliae** (Ellis & Ev.) Arthur & Jackson.

Puccinia Araliae Ellis & Ev. Jour. Myc. 6: 120. 1891.
Dicaeoma Araliae Kuntze, Rev. Gen. 3³: 467. 1898.

O. Pycnia unknown.

III. Telia mostly hypophyllous, crowded on somewhat hypertrophied spots 1–3 mm. in diameter, round or oblong, 0.3–0.5 mm. across, soon naked, slightly pulverulent, light chocolate-brown, ruptured epidermis conspicuous; teliospores oblong, 16–23 by 30–38 μ, rounded or obtuse at both ends, not or slightly constricted at septum; wall dark cinnamon-brown, thin, 1–1.5 μ, smooth except for a few irregular lines of verrucose markings; pedicel colorless, fragile, about as long as spore.

ON ARALIACEAE:

Panax trifolium L., Massachusetts.

TYPE LOCALITY: [Boston], Massachusetts, on *Panax trifolium*.

DISTRIBUTION: Known only from the type locality.

ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 37, f. 121.*

67. **Micropuccinia Cryptotaeniae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Cryptotaeniae Peck, Bull. Buffalo Soc. Nat. Sci. 1: 66. 1873.
Puccinia Astrantiae Berk. & Curt. Grevillea 3: 52. 1874. Not *P. Astrantiae* Kalchbr. 1865.
Dicaeoma Astrantiae Kuntze, Rev. Gen. 3³: 468. 1898.
Dicaeoma Cryptotaeniae Kuntze, Rev. Gen. 3³: 468. 1898.
Allodus Cryptotaeniae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.

O. Pycnia amphigenous, numerous, preceding or among the telia, punctiform, dark-brown, depressed-globoid, small, 65–80 μ broad by 50–65 μ high; ostiolar filaments up to 45 μ long.

III. Telia amphigenous, chiefly hypophyllous and caulicolous, scattered singly or more commonly in irregular groups of few to many sori, often following the veins, petioles, and stems, small, round, 0.2–0.5 mm. across, standing well out from surface of leaf, opening tardily by a central pore, chestnut-brown, becoming somewhat pulverulent with age, ruptured epidermis cinereous, persistent and conspicuous; teliospores somewhat irregularly ellipsoid, oblong, or fusiform, 14–20 by 28–46 μ, rounded or obtuse above, rounded or narrowed below, not or very slightly constricted at septum; wall cinnamon-brown, uniformly thin, 1.5–2 μ, with abrupt hyaline papilla at apex and over pore of lower cell at septum, smooth; pedicel colorless, fragile, as long as spore, or more commonly deciduous.

This species is correlated with *Allodus microica* (Ellis) Orton, the telial characters being practically identical, and the hosts being the same. The two forms are closely related, having undoubtedly had a common origin.

ON AMMIACEAE:

Deringa canadensis (L.) Kuntze (*Cryptotaenia canadensis* DC.), Connecticut, Delaware, Iowa, Massachusetts, New Jersey, New York, Pennsylvania, Wisconsin; Canada.

TYPE LOCALITY: North Greenbush, New York, on *Cryptotaenia canadensis*.

DISTRIBUTION: Delaware northward to southeastern Canada and westward to northern Iowa.

ILLUSTRATIONS: Ann. Rep. N. Y. State Mus. 25: *pl. 2, f. 12;* Holway, N. Am. Ured. 1: *pl. 39, f. 131;* Sitz.-ber. Böhm. Ges. Wiss. 1900[26]: *f. 36–40.*

EXSICCATI: Barth. N. Am. Ured. *630, 2240;* Ellis, N. Am. Fungi *1450;* Ellis & Ev. Fungi Columb. *485;* Ellis & Ev. N. Am. Fungi *2412;* Rel. Farl. *250;* Sydow, Ured. *2020.*

68. **Micropuccinia Musenii** (Ellis & Ev.) Arthur & Jackson.

Puccinia Musenii Ellis & Ev. Bull. Torrey Club **27**: 61. 1900.
Puccinia Seymourii Lindr. Medd. Stockh. Högsk. Bot. Inst. 4[9]: 4. 1901.
Allodus Musenii Orton, Mem. N. Y. Bot. Gard. 6: 193. 1916.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, scattered or confluent into large groups sometimes 20 mm. long, usually roundish or linear, 0.2–0.4 mm. long, long covered by the epidermis, pulverulent, blackish; teliospores broadly ellipsoid, 18–25 by 29–42 μ, usually rounded at both ends; wall chestnut- or chocolate-brown, 2–3 μ thick, 4–7 μ thick above, conspicuously but finely verrucose, the markings more prominent at apex; pedicel hyaline, deciduous, rarely up to 3 or 4 times length of spore.

ON AMMIACEAE:

Daucophyllum tenuifolium (Nutt.) Rydb. (*Musenion tenuifolium* Nutt.), Nebraska, Wyoming.

Elophus Parishii Coult. & Rose, California.

Oreoxis humilis Raf., Colorado.

Pseudopteryxia anisata (A. Gray) Rydb. (*Pseudocymopterus anisatus* Coult. & Rose), Colorado, Wyoming.

Pseudoreoxis bipinnatus (S. Wats.) Rydb. (*Pseudocymopterus bipinnatus* Coult. & Rose, *Cymopterus bipinnatus* S. Wats.), Montana.

TYPE LOCALITY: Freezeout Hills, Wyoming, on *Musenion tenuifolium*.

DISTRIBUTION: Western Nebraska and Colorado to southern Montana and central California.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 38, f. 126a, b.*
EXSICCATI: Barth. N. Am. Ured. *50;* Clements, Crypt. Form. Colo. *139.*

69. **Micropuccinia poromera** (Holway) Arthur & Jackson.

Puccinia poromera Holway, N. Am. Ured. 1: 90. 1913.

O. Pycnia unknown.

III. Telia amphigenous or caulicolous, on irregular discolored spots, minute, 0.1–0.5 mm. across, gregarious and occasionally confluent, especially on petioles and stems, early naked, chestnut-brown, pulverulent, ruptured epidermis conspicuous; teliospores globoid, broadly ellipsoid, or oblong, small, variable in size, 14–26 by 26–40 μ, rounded at both ends, not or slightly constricted at septum; wall light chestnut-brown, uniformly thin, 1–1.5 μ. with prominent hyaline papilla over pore of either cell, the pore in each cell usually at or near septum, smooth; pedicel hyaline, fragile, short.

ON AMMIACEAE:

Angelica dilatata A. Nelson, Utah.
TYPE LOCALITY: Wasatch Mountains, near Salt Lake City, Utah, on *Angelica dilatata.*
DISTRIBUTION: Salt Lake County, Utah.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 42, f. 136.*
EXSICCATI: Garrett, Fungi Utah. *190.*

70. **Micropuccinia Ligustici** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Ligustici Ellis & Ev. Bull. Torrey Club **22**: 363. 1895.
Puccinia luteobasis Ellis & Ev. Bull. Torrey Club **24**: 457. 1897.
Dicaeoma Ligustici Kuntze, Rev. Gen. **3³**: 469. 1898.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, round, 0.3–0.8 mm. across, gregarious, often on yellowish spots, occasionally becoming confluent, especially when caulicolous, early naked, becoming pulverulent, chocolate-brown, ruptured epidermis conspicuous, often persisting as a cup-like enclosure surrounding the telia; teliospores broadly ellipsoid or oblong, 16–22 by 24–34 μ, rounded at both ends, not or scarcely constricted at septum; wall uniformly 1.5–2 μ thick, chestnut-brown, smooth, or with a few inconspicuous tubercles scattered or in irregular rows, the pores variable in position and each covered with a small umbo; pedicel colorless, fragile, short, often attached laterally.

This species is correlated with *Dicaeoma Bistortae* (DC.) Kuntze, the telial characters of the two species being quite similar, as well as the habitats, and the family to which the hosts of the short-cycled form belong being the same as that of the known aecial host of the heteroecious species.

ON AMMIACEAE:

Angelica ampla A. Nelson, Colorado.
Angelica Grayi Coult. & Rose, Colorado.
Atenia Gairdneri Hook. & Arn. (*Carum Gairdneri* A. Gray), Utah.
Atenia Garrettii (A. Nelson) Rydb. (*Carum Garrettii* A. Nelson), Utah.
Conioselinum scopulorum (A. Gray) Coult. & Rose (*Ligusticum scopulorum* A. Gray), Colorado.
Ligusticum apiifolium (Nutt.) A. Gray, Oregon, Washington; British Columbia.
Ligusticum Cusickii Coult. & Rose, Nevada.
Ligusticum filicinum S. Wats., Utah.
Ligusticum Grayi Coult. & Rose, California, Washington.
Ligusticum Leibergi Coult. & Rose, Idaho.
Ligusticum Porteri Coult. & Rose, Colorado.
Ligusticum sp., Montana.
Oxypolis Fendleri (A. Gray) A. Heller, Colorado.

TYPE LOCALITY: Sangre de Christo Mountains, Colorado, on *Ligusticum scopulorum.*
DISTRIBUTION: Mountains of southern Colorado to western Nevada, and northward to British Columbia.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 40, f. 132a–f.*
EXSICCATI: Barth. N. Am. Ured. *1456, 1558;* Clements, Crypt. Form. Colo. *321, 322;* Garrett, Fungi Utah. *57, 233.*

71. **Micropuccinia porphyrogenita** (M. A. Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia acuminata Peck, Ann. Rep. N. Y. State Mus. **23**: 57. 1873. Not *P. acuminata* Fuckel, 1870.
Puccinia porphyrogenita M. A. Curt.; Thüm. Myc. Univ. *545*. 1876.
Dicaeoma porphyrogenitum Kuntze, Rev. Gen. **3**[3]: 478. 1898.
Dasyspora acuminata Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or crowded in groups up to 5 mm. in diameter, opposite red spots, round or oblong, 1–2 mm. across, early naked, pulvinate, chocolate-brown, ruptured epidermis conspicuous; teliospores oblong-clavate or clavate, 16–23 by 45–64 μ, obtuse, acute, or acuminate above, narrowed below, constricted at septum; wall chestnut-brown, 1.5–3 μ thick, thickened at apex, 7–20 μ, smooth; pedicel yellowish-brown, about as long as spore, persistent.

ON CORNACEAE:
Chamaepericlimenum canadense (L.) Asch. & Graebn. (*Cornus canadensis* L.), Alaska, Idaho, Maine, Minnesota, Montana, New Hampshire, New York, Oregon, Washington; Newfoundland; British Columbia, Nova Scotia.

TYPE LOCALITY: Sandlake, New York, on *Cornus canadensis*.

DISTRIBUTION: Newfoundland and Maine along northern border of United States and adjacent Canada to Oregon and Alaska.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 3, f. 14;* Holway, N. Am. Ured. **1**: *pl. 44, f. 143.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *14;* Barth. Fungi Columb. *4948;* Barth. N. Am. Ured. *1127, 1518;* Ellis, N. Am. Fungi *1032;* Ellis & Ev. Fungi Columb. *1287, 1653;* Rel. Farl. *270;* Seym. & Earle, Econ. Fungi *208;* Sydow, Ured. *333;* Thüm. Myc. Univ. *545.*

72. **Micropuccinia Dayi** (G. W. Clinton) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Dayi G. W. Clinton; Peck, Ann. Rep. N. Y. State Mus. **28**: 60. 1876.
Dicaeoma Dayi Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dasyspora Dayi Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Glaucis Arth. Bull. Torrey Club **37**: 571. 1910.

O. Pycnia unknown.

III. Telia mostly hypophyllous, crowded or confluent, sometimes circinating opposite reddish spots 1–6 mm. across, round, 0.1–0.8 mm. in diameter, early naked, pulvinate, light chocolate-brown becoming cinereous by germination, ruptured epidermis evident; teliospores oblong or oblong-clavate, 16–24 by 40–58 μ, obtuse or acute above, rounded or narrowed below, constricted at septum; wall cinnamon-brown, 1.5–2.5 μ, thickened at apex, 5–10 μ, smooth; pedicel tinted, about length of spore.

This species is correlated with *Nigredo Polemonii* (Peck) Arth. and *Dicaeoma Distichlidis* (Ellis & Ev.) Kuntze, the telial characters of the three species being similar or identical, and the hosts of the aecial stage of the two heteroecious species being the same as those of the short-cycled species. This agreement doubtless indicates a common origin for the three species.

ON PRIMULACEAE:
Glaux maritima L., Nova Scotia.
Steironema ciliatum (L.) Raf. (*Lysimachia ciliata* L.), Indiana, Iowa, Michigan, Montana, New York, West Virginia; Alberta, Ontario.
Steironema lanceolatum (Walt.) A. Gray (*Lysimachia lanceolata* Walt.), Wisconsin.

TYPE LOCALITY: Buffalo, New York, on *Lysimachia ciliata*.

DISTRIBUTION: West Virginia to southern Indiana and northwestern Montana, northward into Canada.

ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 8.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *8;* Barth. Fungi Columb. *2661, 4145;* Barth. N. Am. Ured. *138, 941;* Ellis. N. Am. Fungi *1453;* Ellis & Ev. Fungi Columb. *189;* Seym. & Earle, Econ. Fungi Suppl. *B10;* Sydow, Ured. *2413, 2518.*

73. **Micropuccinia Comandrae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Comandrae Peck, Bull. Torrey Club **11**: 49. 1884.
Dicaeoma Comandrae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dasyspora Comandrae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, crowded in spots 3–15 mm. across or completely covering the leaves, completely covering the stems in areas 0.8–5.5 cm. long, round, 0.3–1 mm. in diameter, early naked, pulvinate, brownish-black, ruptured epidermis evident; teliospores oblong or ellipsoid, 16–23 by 35–55 μ, rounded or obtuse above, rounded below, slightly constricted at septum; wall chestnut- or golden-brown, 1.5–2.5 μ, thickened at apex, 4–7 μ, smooth; pedicel tinted, up to twice length of spore.

This species is correlated with *Dicaeoma Andropogonis* (Schw.) Kuntze, corresponding to the race having aecia on *Santalaceae*.

ON SANTALACEAE:
Comandra pallida A. DC., Colorado, Montana, Nevada, Utah, Washington; Alberta.
Comandra umbellata (L.) Nutt., California, Michigan, Oregon; Quebec.
TYPE LOCALITY: Washington, on *Comandra pallida*.
DISTRIBUTION: From northern California and central Colorado northward into Canada, and locally from southern Quebec to northern Michigan.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 11, f. 47.*
EXSICCATI: Barth. N. Am. Ured. *134, 1232, 1641, 1752;* Ellis & Ev. Fungi Columb. *1957;* Garrett, Fungi Utah. *17;* Sydow, Ured. *821, 1912.*

74. **Micropuccinia Haleniae** (Arth. & Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Haleniae Arth. & Holway; Arth. Bull. Geol. Nat. Hist. Surv. Minn. **3**: 30. 1887.
Dicaeoma Haleniae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dasyspora Haleniae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia mostly epiphyllous and caulicolous, crowded and confluent in groups 3–12 mm. across on the leaves, up to 3.5 cm. long on the stems, round or oblong, 0.2–0.8 mm. long, remaining covered by the epidermis, compact, hard, chocolate-brown, shining; stroma abundant, surrounding each sorus, golden- or chestnut-brown, up to 60 μ thick; teliospores cylindric or cylindric-clavate, 8–16 by 32–58 μ, truncate, rounded or obtuse above, rounded or narrowed below, not constricted at septum; wall dark cinnamon-brown above, lighter or colorless below, thin, 1–1.5 μ, slightly thickened at apex, 2.5–4 μ, smooth; pedicel light-brown, 10–20 μ long.

ON GENTIANACEAE:
Dasystephana calycosa (Griseb.) Rydb. (*Gentiana calycosa* Griseb.), Wyoming.
Halenia deflexa (J. E. Smith) Griseb., Michigan, Minnesota, Wisconsin.
TYPE LOCALITY: Vermilion Lake, Minnesota, on *Halenia deflexa*.
DISTRIBUTION: Northern Michigan to western Wyoming.
EXSICCATI: Barth. N. Am. Ured. *145, 448;* Vesterg. Micr. Rar. Sel. *1712.*

75. **Micropuccinia concrescens** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Dicaeoma surinamense Kuntze, Rev. Gen. **3**[3]: 467, hyponym. 1898.
Puccinia compacta Kunze; Sydow, Monog. Ured. **1**: 334. 1902. Not *P. compata* Berk. 1855, De Bary 1858, nor Thüm. 1875.
Dasyspora compacta Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia concrescens Ellis & Ev.; Arth. Mycologia **7**: 240. 1915.

O. Pycnia unknown.

III. Telia hypophyllous, in orbicular groups on discolored spots, pulvinate, crowded but distinct, becoming confluent at the center into a cushion-like mass 2–4 mm. across, chestnut-brown, often darker at center of the groups and paler at edges; teliospores oblong-elliptic, often irregular, 10–20 by 20–40 μ, rounded or obtuse at both ends, or oftener somewhat narrowed below, slightly or not constricted at septum, which is occasionally oblique; wall chestnut-brown or paler, smooth, uniformly thick, 1.5–2 μ or slightly thicker above in some spores; pedicel as long as or longer than spore, usually deciduous.

ON ASCLEPIADACEAE:
Asclepias curassavica L., Bahamas; Cuba; Porto Rico.
Asclepias nivea L., Porto Rico.
TYPE LOCALITY: Aibonito, Porto Rico, on *Asclepias curassavica*.
DISTRIBUTION: West Indies; also in South America.

ILLUSTRATIONS: Hedwigia Beibl. **42**: 31. *f. 10–14.*
EXSICCATI: Barth. N. Am. Ured. *1642.*

76. **Micropuccinia obliqua** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia obliqua Berk. & Curt.; Berk. Jour. Linn. Soc. **10**: 356. 1869.
Puccinia Gonolobi Rav.; Berk. Grevillea **3**: 54. 1874.
Puccinia Cynanchi Lagerh. Bol. Soc. Brot. **7**: 129. 1889.
Puccinia Kunzeana P. Henn. Hedwigia **33**: 230. 1894.
Puccinia Philibertiae Ellis & Ev. Bull. Torrey Club **22**: 60. 1895.
Dicaeoma Cynanchi Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Gonolobi Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma obliquum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Philibertiae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia sphaerospora Sydow & Henn.; Sydow, Ann. Myc. **1**: 327. 1903.
Puccinia sphaeroidea P. Henn. Hedwigia Beibl. **42**: 107. 1903.
Dasyspora Gonolobi Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, on discolored spots 2–10 mm. across, gregarious, distinct or becoming more or less confluent, often arranged concentrically, rarely scattered or solitary, mycelium often becoming locally systemic, forming witches' brooms, and then telia scattered evenly or becoming confluent over young stems and both surfaces of leaves, small, round, 0.2–0.8 mm. across, early naked, compact, often pulvinate, cinnamon- or blackish-brown, often cinereous by germination, ruptured epidermis usually not noticeable; teliospores obovate, ellipsoid, or globoid, 15–23 by 24–35 μ, rounded above, rounded or somewhat narrowed below, not constricted at septum; wall golden- or dark cinnamon-brown, variable in thickness, 1.5–3.5 μ, slightly thickened above, 3–6 μ, smooth; pedicel once to twice length of spore, sometimes longer or shorter, colorless or tinted next spore, often inserted obliquely; mesospores occasionally intermixed.

ON ASCLEPIADACEAE:
Fischeria crispiflora (Sw.) Schlecht., Cuba; Jamaica.
Fischeria sp., Panama.
Funastrum clausum (Jacq.) Schlechter (*Cynanchum clausa* Jacq., *Philibertia clausa* K. Schum., *Philibertella clausa* Vail), Florida; Bahamas; Cuba.
Funastrum crassifolium (Hemsl.) Schlechter (*Philibertia crassifolia* Hemsl., *Philibertella crassifolia* Vail), Oaxaca; Guatemala.
Funastrum cynanchoides (Decaisne) Schlechter (*Philibertia cynanchoides* A. Gray, *P. viridiflora* Britt. & Rusby, *Philibertella cynanchoides* Vail), Arizona, New Mexico.
Funastrum hirtellum (A. Gray) Schlechter (*Philibertia linearis hirtella* A. Gray, *P. hirtella* Parish, *Philibertella hirtella* Vail), California.
Funastrum lineare heterophyllum (Engelm.) F. Macbr. (*Philibertia linearis heterophylla* A. Gray, *Philibertella Hartwegii heterophylla* Vail, *P. heterophylla* Cockerell), Arizona, California.
Funastrum sp., Lower California.
Gonolobus laevis Michx. (*Enslenia albida* Nutt., *Ampelanus albidus* Britton), Texas.
Metalepis cubensis Griseb., Cuba.
Metastelma angustifolium Turcz., Mexico (state).
Metastelma bahamense Griseb. (*M. cubense* Griseb.), Florida.
Metastelma barbigerum Scheele, Texas.
Metastelma lineare Bello, Porto Rico.
Metastelma palustre (Pursh) Schlechter (*Vincetoxicum palustre* A. Gray, *Seutera maritima* Decaisne, *S. palustris* Vail), Florida, Mississippi; Bahamas.
Metastelma parviflorum R. Br., Porto Rico; St. Thomas; St. Croix.
Metastelma penicillatum Griseb., Cuba.
Metastelma sp., Panama.
Vincetoxicum bifidum (Hemsl.) Arth. (*Gonolobus bifidus* Hemsl.), Hidalgo, Zacatecas.
Vincetoxicum erianthum (Decaisne) Arth. (*Gonolobus erianthus* Decaisne), Veracruz.
Vincetoxicum gonocarpos Walt. (*Gonolobus macrophyllus* Michx.), Mississippi, South Carolina.
Vincetoxicum hirsutum (Michx.) Britton (*Gonolobus hirsutus* Michx.), Mississippi.
Vincetoxicum mexicanum S. Wats., San Luis Potosí.
Vincetoxicum productum (Torr.) Vail (*Gonolobus productus* Torr.), Arizona.
Vincetoxicum uniflorum (H.B.K.) Arth. (*Gonolobus uniflorus* H.B.K.), Morelos.
Vincetoxicum sp., Kentucky, Louisiana, Texas; Coahuila; Nicaragua; Guatemala.

TYPE LOCALITY: Cuba, on "some plant resembling chickweed," now determined as *Metastelma penicillatum.*
DISTRIBUTION: Southern California to Kentucky and South Carolina southward through the West Indies and Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 45, f. 578.*
EXSICCATI: Barth. Fungi Columb. *2452;* Barth. N. Am. Ured. *442, 2436;* Ellis, N. Am. Fungi *256;* Kellerm. Fungi Sel. Guat. *5;* Rav. Fungi Car. **4**: *91.*

77. **Micropuccinia Dichondrae** (Mont.) Arthur & Jackson.

Puccinia Dichondrae Mont. in C. Gay, Fl. Chil. **8**: 46. 1852.
Puccinia Berkeleyana De-Toni, in Sacc. Syll. Fung. **7**: 717. 1888.
Puccinia munita F. Ludwig, Zeits. Pflanzenkr. **2**: 133. 1892.
Dicaeoma Berkeleyanum Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Dichondrae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma munitum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Allodus Dichondrae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, usually evenly scattered over the entire leaf-surface and often extending to the petioles, round, small, 0.2–0.5 mm. across, punctiform, early naked, pulverulent, chestnut-brown, the conspicuous epidermis forming a peridium-like border; teliospores oblong or clavate, 14–20 by 28–45 μ, rounded or obtuse above, rounded or often narrowed below, constricted at septum; wall cinnamon- or light chestnut-brown, thin, 1.5–2 μ, thickened above by sub-hyaline apiculus to 4–7 μ, smooth; pedicel slender, equaling spore or shorter.

On Dichondraceae:
Dichondra carolinensis Michx., Louisiana, Mississippi, North Carolina; Bermuda.
Dichondra repens Forst., California.
Dichondra sericea Sw., Guatemala.
Type locality: Chile, on *Dichondra sericea*.
Distribution: Southern border of the United States southward through the West Indies and Central America; also in South America, Australia, and New Zealand.
Illustration: McAlpine, Rusts Austr. *pl. 5, f. 42; pl. 40, f. 299.*

78. **Micropuccinia Polemonii** (Dietel & Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Polemonii Dietel & Holway; Dietel, Bot. Gaz. **18**: 255. 1893.
?*Puccinia Polemonii* Störmer, Bot. Notiser **1896**: 214. 1896.
Dicaeoma Polemonii Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Polemonii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia amphigenous and petiolicolous, small, round, gregarious and confluent in small groups 0.5–2 mm. across, or more elongate and occurring in lines on the petioles, compact, pulvinate, early naked, golden- or cinnamon-brown, becoming whitish from germination, ruptured epidermis not conspicuous; teliospores oblong or cylindric, 13–18 by 26–42 μ, obtuse above, rounded or somewhat narrowed below, strongly constricted at septum; wall colorless or cinnamon-brown, 1–1.5 μ thick, thickened at apex, 4–6 μ, smooth; pedicel colorless, fragile, as long as spore or shorter.

On Polemoniaceae:
Polemonium intermedium (A. Brand) Rydb., Idaho.
Polemonium occidentale Greene, California.
Polemonium reptans L., Indiana.
Type locality: Kootenai County, Idaho, on *Polemonium caeruleum*, now determined as *P. intermedium*.
Distribution: Local in Idaho, central California, and southern Indiana.

79. **Micropuccinia gulosa** (H. S. Jackson) Arthur & Jackson.

Puccinia gulosa H. S. Jackson; Arth. Bull. Torrey Club **47**: 470. 1920.

O. Pycnia unknown.

III. Telia chiefly caulicolous and petiolicolous, oval or elliptic, gregarious and confluent, extending 1–2 cm. along stems and petioles, early naked, cinnamon-brown, pulverulent, ruptured epidermis noticeable; teliospores ellipsoid or oblong, 15–18 by 26–35 μ, rounded above and below, strongly constricted at septum; wall cinnamon-brown, uniformly 1.5–2 μ thick, the apical pore covered with a low sub-hyaline umbo, 2.5–3 μ thick, finely but noticeably verrucose-rugose, best seen when dry; pedicel colorless, short, deciduous.

On Polemoniaceae:
Polemonium pulcherrimum Hook., California.
Type locality: Colby Mountain, Yosemite National Park, California, on *Polemonium pulcherrimum*.
Distribution: Known only from the type locality.

80. **Micropuccinia Hydrophylli** (Peck & Clinton) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Hydrophylli Peck & Clinton; Peck, Ann. Rep. N. Y. State Mus. **30**: 54. 1878.
Dicaeoma Hydrophylli Kuntze, Rev. Gen. **3**[3]: 469. 1898.

O. Pycnia unknown.

III. Telia hypophyllous and petiolicolous, occasionally epiphyllous, round, 0.5–1 mm. in diameter, scattered or more commonly gregarious and confluent on yellowish spots 0.2–1 cm. across, early naked, chestnut-brown, pulverulent, ruptured epidermis noticeable; teliospores broadly ellipsoid, 11–20 by 23–30 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, uniformly 1–1.5 μ thick, not or scarcely thickened over pores, minutely and moderately verrucose, with conic projections, somewhat less prominent near base of spore; pedicel colorless, short, deciduous.

ON HYDROPHYLLACEAE:
Hydrophyllum capitatum Dougl., Colorado, Utah.
Hydrophyllum Fendleri (A. Gray) A. Heller, Colorado.
Hydrophyllum occidentale A. Gray, California.
Hydrophyllum virginianum L., Iowa, Nebraska, New York, North Dakota, South Dakota, Wisconsin.
Hydrophyllum Watsonii (A. Gray) Rydb., Utah.
TYPE LOCALITY: Buffalo, New York, on *Hydrophyllum virginianum*.
DISTRIBUTION: Northwestern New York to central Colorado and central California, and northward.
EXSICCATI: Barth. Fungi Columb. *3945;* Barth. N. Am. Ured. *346;* Brenckle, Fungi Dak. *490;* Carleton, Ured. Am. *16;* Ellis, N. Am. Fungi *1043;* Ellis & Ev. Fungi Columb. *1855;* Garrett, Fungi Utah. *30, 81;* Sydow, Ured. *472, 1927*.

81. **Micropuccinia Romanzoffiae** (H. S. Jackson) Arthur & Jackson.

Puccinia Romanzoffiae H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 268. 1918.

O. Pycnia not seen.

III. Telia chiefly hypophyllous and petiolicolous, crowded in confluent groups 1–2 mm. across, or covering extensive areas on the petioles, small, early naked, pulverulent, chestnut-brown, ruptured epidermis noticeable; teliospores somewhat irregularly ellipsoid or oblong, 19–24 by 34–42 μ, rounded above and below, not or scarcely constricted at septum; wall chestnut-brown, 2–3 μ thick, with large sparsely distributed irregular tubercles, thickened at apex by a low sub-hyaline umbo, 4–5 μ, the pore of lower cell at septum, similarly thickened; pedicel colorless, short, deciduous.

ON HYDROPHYLLACEAE:
Romanzoffia sitchensis Bong., Oregon.
TYPE LOCALITY: Mount Jefferson, Oregon, on *Romanzoffia sitchensis*.
DISTRIBUTION: Known only from the type locality.

82. **Micropuccinia Phaceliae** (Sydow & Holway) Arthur & Jackson.

Puccinia Phaceliae Sydow & Holway; Sydow, Monog. Ured. **1**: 314. 1902.

O. Pycnia not seen.

III. Telia amphigenous, in compact, roundish groups 1–5 mm. across, blackish, permanently covered by epidermis, compound by development of chestnut-brown stroma composed of irregularly clavate paraphysoid hyphae, 48–64 μ long; teliospores angularly clavate or cylindric, 18–20 by 35–48 μ, rounded or truncate above, narrowed below, not constricted at septum; wall thin, 1–1.5 μ, light chestnut-brown, dark chestnut-brown and thickened at apex, 3–7 μ, smooth; pedicel short, colored like spore; mesospores occasionally intermixed.

This species is correlated with one of the races of *Dicaeoma apocryptum* (Ellis & Tracy) Kuntze, the telial characters of the two species being essentially the same, and the host of the short-cycled species corresponding to a group of aecial hosts of the heteroecious species.

ON HYDROPHYLLACEAE:
Phacelia sericea (Graham) A. Gray, Washington.
TYPE LOCALITY: Mount Tacoma, Washington, on *Phacelia circinata*, error for *P. sericea*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *1464*.

83. **Micropuccinia Heliotropii** (Kern & Kellerm.) Arthur & Jackson.

Puccinia Heliotropii Kern & Kellerm.; Kern, Jour. Myc. **13**: 23. 1907.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, gregarious, densely crowded in orbicular groups 2–8 mm. across, often confluent, round, small, 0.1–0.4 mm. across, early naked, compact, somewhat pulvinate, chestnut-brown, becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong, ellipsoid, or oblong-obovoid, 14–19 by 35–45 μ, rounded or obtuse above, usually narrowed to pedicel below, slightly constricted at septum; wall nearly colorless or light cinnamon-brown, thin, 1–1.5 μ, thickened 3–7 μ above, smooth; pedicel colorless, fragile, equaling spore, usually deciduous; mesospores occasionally intermixed.

ON HELIOTROPIACEAE:
Heliotropium indicum L., Guatemala.
TYPE LOCALITY: Gualán, Zacapa, Guatemala, on *Heliotropium indicum*.
DISTRIBUTION: Eastern Guatemala.

84. **Micropuccinia Mertensiae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Mertensiae Peck, Bot. Gaz. **6**: 227. 1881.
Dicaeoma Mertensiae Kuntze, Rev. Gen. **3**[3]: 469. 1898.

O. Pycnia unknown.

III. Telia chiefly hypophyllous or petiolicolous, occasionally epiphyllous, round, 0.2–1 mm. in diameter, gregarious and more or less confluent in groups 0.5–1 cm. across, on yellowish spots, early naked, chocolate-brown, pulverulent, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 18–21 by 24–32 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, 1.5–2 μ thick, scarcely thickened at apex and over pore of lower cell, which is usually depressed half way to pedicel, closely and finely verrucose-tuberculate with flat tubercles, which become successively smaller and closer from apex to base of spore; pedicel colorless, deciduous.

ON BORAGINACEAE:
Mertensia arizonica Greene, Utah.
Mertensia Bakeri Greene, Colorado.
Mertensia ciliata (Torr.) G. Don (*M. sibirica* G. Don, *M. polyphylla* Greene), Colorado, Utah, Wyoming.
Mertensia foliosa A. Nelson, Utah.
TYPE LOCALITY: Colorado, on *Mertensia sibirica*.
DISTRIBUTION: Mountain region of Colorado, Wyoming and Utah.
EXSICCATI: Clements, Crypt. Form. Colo. *571;* Garrett, Fungi Utah. *166;* Sydow, Ured. *1931.*

85. **Micropuccinia Urbaniana** (P. Henn.) Arthur & Jackson.

Puccinia Urbaniana P. Henn. Hedwigia **37**: 278. 1898.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, occasionally epiphyllous, gregarious and more or less confluent in groups 5–10 mm. across, on brownish or purplish spots, often arranged in a concentric manner, small, 0.2–0.5 mm. across, roundish, somewhat tardily naked, compact, pulvinate, blackish-brown becoming cinereous by germination, ruptured epidermis usually not conspicuous; teliospores ellipsoid or clavate, 14–22 by 28–45 μ, somewhat irregular, rounded above, narrowed to pedicel below, slightly constricted at septum; wall cinnamon- or light chestnut-brown, 1–2 μ thick, thickened 4–7 μ above, smooth; pedicel fragile, colored like the spore-wall or lighter, equaling spore or shorter.

ON VERBENACEAE:
Cornutia grandifolia Schauer, Guatemala.
Valerianodes cayennensis (Vahl) Kuntze (*Stachytarpheta cayennensis* Vahl), Costa Rica.
Valerianodes jamaicensis (L.) Kuntze (*Stachytarpheta jamaicensis* Vahl, *S. dichotoma* Vahl), Florida; Guatemala; Jamaica; Bahamas; Cuba; Porto Rico.
Valerianodes strigosa (Vahl) Cook & Collins (*Stachytarpheta strigosa* Vahl), Mona Island; Porto Rico.
TYPE LOCALITY: Port Antonio, Jamaica, on *Stachytarpheta jamaicensis*.

DISTRIBUTION: Southern Florida, the West Indies, and Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 21, f. 298.*
EXSICCATI: Barth. N. Am. Ured. *669, 1672.*

86. **Micropuccinia Lantanae** (Farl.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Lantanae Farl. Proc. Am. Acad. Sci. **18**: 83. 1883.
Uromyces Lantanae Speg. Anal. Soc. Ci. Argent. **17**: 93. 1884.
Caeomurus Lantanae Kuntze, Rev. Gen. **3**[3]: 450. 1898.
Dicaeoma Lantanae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Puccinia accedens Sydow, Mong. Ured. **1**: 309. 1902.
Dasyspora Lantanae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Puccinia Privae Sydow, Ann. Myc. **5**: 338. 1907.
Uromyces Lippiae Speg. Anal. Mus. Nac. Buenos Aires **19**: 313. 1909.

O. Pycnia unknown.

III. Telia hypophyllous, occasionally epiphyllous, gregarious and more or less confluent on purplish spots 2–10 mm. across, few to many, roundish, 0.2–0.5 mm. across, compact, pulvinate, early naked, blackish becoming cinereous by germination, ruptured epidermis usually not conspicuous; teliospores irregularly ellipsoid or clavate, 15–20 by 24–40 μ, rounded above, rounded or narrowed below, slightly constricted at septum; wall 1.5–2.5 μ, thickened 3–5 μ above, chestnut-brown above, lighter below, smooth; pedicel firm, colorless or tinted like the spore, often slightly inflated above, once to twice length of spore; mesospores usually more numerous than teliospores, angularly ellipsoid or obovate, 15–20 by 20–32 μ, rounded above, narrowed to pedicel below, otherwise like teliospores.

ON VERBENACEAE:
Goniostachyum citrosum Small, Florida.
Lantana aculeata L., St. Thomas.
Lantana Camara L., Costa Rica; Cuba; Jamaica; Porto Rico.
Lantana crocea Jacq., Jamaica.
Lantana hispida H.B.K., Costa Rica.
Lantana involucrata L. (*L. odorata* L.), Florida; Bermuda; Cuba; Mona Island; Porto Rico.
Lantana purpurea Benth. & Hook., Guerrero, Morelos, Veracruz.
Lantana reticulata Pers., Cuba.
Lantana stricta Sw., Jamaica.
Lantana trifolia L., Panama; Cuba.
Lippia dulcis Trev., Cuba.
Lippia nodiflora (L.) Rich., Haïti.
Lippia stoechadifolia (L.) H.B.K. (*Phyla stoechadifolia* Small), Cuba.
Priva lappulacea (L.) Pers. (*P. echinata* Juss.), Cuba; Jamaica.
TYPE LOCALITY: Bermuda, on *Lantana odorata.*
DISTRIBUTION: Southern Florida, the West Indies, southern Mexico, and Central America; also in South America.
ILLUSTRATIONS: Sydow, Mong. Ured. **1**: *pl. 20, f. 291; pl. 21, f. 297;* **2**: *pl. 2, f. 28.*
EXSICCATI: Barth. N. Am. Ured. *645, 646, 749, 1161;* Ellis, N. Am. Fungi *1052.*

87. **Micropuccinia permagna** (Arth. & Holway) Arthur & Jackson.

Puccinia permagna Arth. & Holway; Arth. Mycologia **10**: 134. 1918.

O. Pycnia epiphyllous, loosely grouped on yellowish spots, 0.4–1.5 mm. across, noticeable, blackish-brown, conoidal, 112–128 μ broad by 55–80 μ high; ostiolar filaments not noticeable.

III. Telia mostly hypophyllous, numerous, single or crowded into irregular groups, roundish, large, 1–2.5 mm. across, somewhat pulvinate, cinnamon-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 24–27 by 35–42 μ, rounded at both ends, slightly constricted at septum; wall cinnamon-brown, thin, 1 μ, thicker above and over pore near septum, 3–6 μ, forming a hyaline umbo, smooth; pedicel very large and inflated, 20–25 μ in diameter, often somewhat fusiform, four or five times length of spore, the wall colorless, thin, 1 μ, usually thickened next to spore.

ON VERBENACEAE:
Lippia myriocephala Schlecht. & Cham., Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Lippia myriocephala.*
DISTRIBUTION: Known only from the type locality.

88. **Micropuccinia distorta** (Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia distorta Holway, Ann. Myc. **3**: 22. 1905.
Dasyspora distorta Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia epiphyllous, crowded in small groups about 1 mm. in diameter, inconspicuous, golden-brown, globoid or ellipsoid, 90–125 by 100–195 μ; ostiolar filaments up to 120 μ long, agglutinate into a column.

III. Telia mostly hypophyllous or caulicolous, crowded in irregular groups 1–5 mm. across or up to 3 cm. on stems and causing distortion, round or oblong, 0.3–2 mm. across, early naked, pulverulent, light chocolate-brown, ruptured epidermis evident; teliospores broadly ellipsoid or obovoid-ellipsoid, 20–27 by 29–40 μ, rounded at both ends or somewhat narrowed below, not constricted at septum; wall light chestnut-brown, uniform, 2–3 μ thick, closely and finely verrucose, the pore of upper cell in upper one-third, of lower cell in lower one-third; pedicel colorless, somewhat fragile, up to 80 μ long.

ON LAMIACEAE:
Hyptis Emoryi Torr. (*Mesosphaerum Emoryi* Kuntze), Arizona, California.
Hyptis pectinata Poir. (*Mesosphaerum pectinatum* Kuntze), Guerrero, Jalisco, Morelos, Veracruz.
TYPE LOCALITY: Iguala, Guerrero, Mexico, on *Mesosphaerum pectinatum*.
DISTRIBUTION: Southern California to Southern Mexico.
EXSICCATI: Barth. N. Am. Ured. *433*.

89. **Micropuccinia Physostegiae** (Peck & Clinton) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Physostegiae Peck & Clinton; Peck, Ann. Rep. N. Y. State Mus. **29**: 50. 1878.
Dicaeoma Physostegiae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Physostegiae H. S. Jackson, Proc. Ind. Acad. Sci. **1915**: 440. 1916.

O. Pycnia unknown.

III. Telia hypophyllous, crowded, often covering the entire lower surface of leaf, round, 0.3–0.8 mm. in diameter, often somewhat tardily naked, bullate, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores oblong or ellipsoid, 19–26 by 32–48 μ, rounded above and below, not constricted at septum; wall light chestnut-brown, thick, 2.5–3 μ, sometimes thickened up to 5 μ at apex, closely and finely verrucose; pedicel colorless, about one half length of spore.

ON LAMIACEAE:
Dracocephalum Nuttallii Britton (*Physostegia parviflora* Nutt.), Montana.
Dracocephalum virginianum L. (*Physostegia virginiana* Benth.), Indiana, New York.
TYPE LOCALITY: Strawberry Island, [New York], on *Physostegia virginiana*.
DISTRIBUTION: Locally in New York, Indiana, and Montana.
EXSICCATI: Barth. N. Am. Ured. *1465, 1771*.

90. **Micropuccinia Schneideri** (Schroet.) Arthur & Jackson.

Puccinia caulincola W. G. Schneid. Jahresb. Schles. Ges. **48**: 120. 1870. Not *P. caulincola* Spreng. 1828.
Puccinia Schneideri Schroet.; W. G. Schneid. Herb. Schles. Pilze *448*. 1879.

O. Pycnia unknown.

III. Telia caulicolous, scattered or crowded in small groups from a perennial mycelium, oblong or linear, 1–3 mm. long, soon naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 18–21 by 26–31 μ, rounded at both ends, slightly constricted at septum; wall golden-brown 1.5–2 μ thick, thickened up to 5 μ over pores, smooth, the pore of upper cell apical, of lower variable; pedicel colorless, up to twice length of spore; mesospores ellipsoid, 18–20 by 21–25 μ.

ON LAMIACEAE:
Thymus Serpyllum L., Greenland.
TYPE LOCALITY: Silesia, on *Thymus Chamaedrys*.
DISTRIBUTION: Southern Greenland; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**[2]: *f. 133;* Krypt.-fl. Brand. Pilze **3**: *f. B43*.

91. **Micropuccinia Hyssopi** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Hyssopi Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Sydowiana Zopf; Zopf & Syd. Myc. Mar. *40*. 1880.
Leptopuccinia Hyssopi Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or crowded in groups 1–3 mm. across, round, 0.2–0.7 mm. in diameter, early naked, pulvinate, golden- or chestnut-brown, ruptured epidermis inconspicuous; teliospores cylindric, narrowly ellipsoid, or clavate-oblong, 13–21 by 34–50 μ, obtuse or acute above, rounded or narrowed below, slightly constricted at septum; wall light chestnut- or pale golden-brown, 1.5–2 μ thick, thickened at apex, 6–12 μ, smooth; pedicel tinted, up to 35 μ long, 7–10 μ broad next to spore, often tapering downward, thin-walled, often collapsing.

ON LAMIACEAE:
Agastache nepetoides (L.) Kuntze (*Hyssopus nepetoides* L., *Lophanthus nepetoides* Benth.), Illinois, Indiana, Iowa, New York, Ohio.
Agastache scrophulariaefolia (Willd.) Kuntze (*Hyssopus scrophulariaefolius* Willd., *Lophanthus scrophulariaefolius* Benth.), Minnesota, Pennsylvania, West Virginia.
TYPE LOCALITY: Bethlehem, Pennsylvania, on *Hyssopus scrophulariaefolius*.
DISTRIBUTION: New York to West Virginia, westward to Minnesota and Iowa; also in Germany (cult.).
ILLUSTRATION: Zopf. & Syd. Myc. Mar. *40*.
EXSICCATI: Ellis, N. Am. Fungi *1053*; Ellis & Ev. N. Am. Fungi *1837*; Kellerm. Ohio Fungi *152*.

92. **Micropuccinia pallidissima** (Speg.) Arthur & Jackson.

Puccinia pallidissima Speg. Anal. Soc. Ci. Argent. **12**: 69. 1881.
Puccinia albida Dietel & Neger, Bot. Jahrb. **24**: 160. 1897.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in groups 0.5–2 mm. across, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, pale golden-brown becoming cinereous by germination, ruptured epidermis rather inconspicuous; teliospores fusiform-oblong or oblong-clavate, 12–15 by 34–42 μ, slightly narrowed or rounded above, slightly narrowed below, not or slightly constricted at septum; wall colorless or light-yellow, thin, 1 μ, thickened at apex, 2–5 μ, smooth; pedicel colorless, fragile, up to length of spore.

ON LAMIACEAE:
Stachys Lindenii Benth., Guatemala.
TYPE LOCALITY: Sierra Chica mountains, near San José, Córdoba, Argentina, on *Stachys arvensis*.
DISTRIBUTION: Guatemala; also in South America.

93. **Micropuccinia delicatula** (Arth.) Arthur & Jackson.

Polioma delicatula Arth. Jour. Myc. **13**: 29. 1907.
Puccinia delicatula Sacc. & Trott. in Sacc. Syll. Fung. **21**: 657. 1912.

O. Pycnia unknown.

III. Telia hypophyllous, soon naked, pulvinate, scattered, round, 0.3–0.4 mm. in diameter, or confluent in compact groups 0.5–2 mm. across, dirty-white, ruptured epidermis inconspicuous; teliospores oblong or lanceolate-oblong, 12–16 by 27–48 μ, obtuse above and below, slightly or not constricted at septum, germinating at maturity; wall colorless, uniformly thin, 1–1.5 μ, smooth; pedicel hyaline, fragile, once length of spore or longer, but breaking near the spore and appearing short.

ON LAMIACEAE:
Salvia cinnabarina Mart. & Gal., Guatemala.
Salvia elegans Vahl, Guatemala; Mexico (state).
Salvia Holwayi Standley, Guatemala.
Salvia pulchella DC., Guatemala.
TYPE LOCALITY: Sacred Mount, Amecameca, Mexico, on *Salvia elegans*.
DISTRIBUTION: Southern Mexico and Central America.

94. **Micropuccinia nivea** (Holway) Arthur & Jackson.

Puccinia nivea Holway, Jour. Myc. **11**: 158. 1905.
Polioma nivea Arth. Jour. Myc. **13**: 29. 1907.

O. Pycnia epiphyllous, in small groups, inconspicuous, honey-yellow, globoid, 130–160 μ broad by 110–145 μ high; ostiolar filaments short; pycniospores globoid, 3–4 μ in diameter.

III. Telia chiefly hypophyllous, gregarious, often confluent, in compact groups 1–2 mm. across, soon naked, round, pulvinate, 0.3–0.4 mm. in diameter, dirty-white becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores clavate-oblong or cylindric, 21–23 by 48–61 μ, rounded or obtuse above, usually narrowed below, slightly constricted at septum; wall colorless, moderately thin, 1–2 μ, slightly or not thickened above, smooth; pedicel hyaline, broad, short.

ON LAMIACEAE:
Salvia purpurea Cav., Oaxaca.
TYPE LOCALITY: Oaxaca, Mexico, on *Salvia purpurea*.
DISTRIBUTION: Known only from the type locality.

95. **Micropuccinia Physalidis** (Peck) Arthur & Jackson.

Puccinia Physalidis Peck, Bot. Gaz. **4**: 218. 1879.
Dicaeoma Physalidis Kuntze, Rev. Gen. **3**[3]: 470. 1898.

O. Pycnia not known, probably not formed.

III. Telia hypophyllous, rarely epiphyllous evenly scattered over large areas, evidently from a distributed mycelium, at first punctiform, firm, becoming more or less pulverulent, small, round, 0.2–0.8 mm. across, somewhat tardily naked, chestnut-brown, ruptured epidermis conspicuous; teliospores variable, ellipsoid, obovoid, oblong, or rarely clavate, 16–26 by 28–38 μ, rounded above, rounded, or less commonly narrowed below, slightly or not constricted at septum; wall cinnamon-brown, 1.5–3 μ thick, not or very slightly thickened bove to 4 μ, smooth; pedicel colorless, slender, once length of spore, or more commonly deciduous; mesospores occasionally intermixed.

ON SOLANACEAE:
Physalis heterophylla Nees (*P. viscosa* Pursh not L.), Colorado, Nebraska; Manitoba.
Physalis lanceolata Michx., Iowa.
Physalis virginiana Mill., Wisconsin; Manitoba.
TYPE LOCALITY: Colorado, on *Physalis viscosa*.
DISTRIBUTION: Eastern Colorado to central Wisconsin, northward into Canada.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 18, f. 255*.
EXSICCATI: Barth. N. Am. Ured. *161, 562;* Ellis & Ev. Fungi Columb. *1652*.

96. **Micropuccinia solanita** (Schw.) Arthur & Jackson.

Aecidium solanitum Schw.; Berk. & Curt. Jour. Acad. Phila. II. **2**: 283. 1853.
Puccinia claviformis Lagerh. Tromsö Mus. Aarsh **17**: 53. 1895.
Dicaeoma claviforme Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Puccinia solanita Arth. Mycologia **14**: 19. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious and finally more or less confluent in irregular or orbicular groups 0.5–2 cm. across, on yellowish or discolored spots, small, round, 0.2–0.5 mm. across, at first punctate, compact, becoming somewhat pulvinate, somewhat tardily naked, chestnut-brown becoming cinereous by germination, ruptured epidermis at first noticeable; teliospores somewhat irregularly ellipsoid, obovate, or clavate, 16–26 by 32–46 μ, rounded above, rounded or more commonly narrowed below, usually slightly constricted at septum; wall cinnamon-brown, 1–2.5 μ thick, gradually thickened above, 3–5 μ, smooth; pedicel colorless, or slightly tinted, one half length of spore or shorter; mesospores occasionally intermixed.

ON SOLANACEAE:
Solanum Donnell-Smithii Coult., Panama.
TYPE LOCALITY: Surinam, on *Solanum* sp.
DISTRIBUTION: Panama; also in northern South America.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 18, f. 262*.

97. **Micropuccinia Sarachae** (Mayor) Arthur & Jackson.

Puccinia Sarachae Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 499. 1913.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious in groups 0.2–1 cm. across, on discolored spots, at first yellowish, small, round, 0.2–0.5 mm. in diameter, compact, cinnamon- or chestnut-brown, becoming pulvinate and cinereous by germination; teliospores ellipsoid or obovate, 16–23 by 29–39 μ, rounded or occasionally obtuse above, rounded or somewhat narrowed below, not or very slightly constricted at septum; wall golden-brown below, cinnamon-brown above, 1.5–3 μ thick, considerably thickened above, 5–8 μ, smooth; pedicel colorless, twice length of spore or shorter; mesospores occasionally intermixed.

ON SOLANACEAE:
Saracha jaltomata Schlecht., Costa Rica.
TYPE LOCALITY: Cafetal La Camelia, near Angelopolis, Antioquia, Colombia, on *Saracha edulis*.
DISTRIBUTION: Costa Rica; also in northern South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: *f. 29*.

98. **Micropuccinia incondita** (Arth.) Arthur & Jackson.

Puccinia incondita Arth. Bull. Torrey Club **45**: 148. 1918.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, closely gregarious or confluent into more or less rounded pulvinate masses 1–3 mm. across, dark cinnamon-brown, early naked, ruptured epidermis inconspicuous; teliospores irregularly ellipsoid or oblong, 16–20 by 23–28 μ, rounded at both ends or rarely somewhat narrowed below, slightly or not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, not or somewhat thicker above, up to 6 μ, smooth; pedicel colorless, sometimes longer than spore, usually breaking near spore.

ON SOLANACEAE:
Solanum triquetrum Cav., Texas.
TYPE LOCALITY: Austin, Texas, on *Solanum triquetrum*.
DISTRIBUTION: Known only from the type locality.

99. **Micropuccinia Pittieriana** (P. Henn.) Arthur & Jackson.

Puccinia Pittieriana P. Henn. Hedwigia **43**: 147. 1904.
Uredo Pittieri P. Henn.; Pittier, Pl. Usual. Costa Rica 69, 122, hyponym. 1908.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious and finally more or less confluent in orbicular groups 3–5 mm. across, on yellowish or discolored spots, small, round, 0.2–0.5 mm. across, early naked, chestnut-brown, at first compact, becoming somewhat pulverulent in resting form, in germinating form becoming pulvinate and cinereous, ruptured epidermis not conspicuous; teliospores small, broadly ellipsoid or oblong, 18–23 by 26–34 μ, rounded above and below, not or slightly constricted at septum; wall cinnamon-brown, 1–2.5 μ thick, slightly and gradually thickened above, 4–6 μ, smooth; pedicel colorless, firm, once to twice length of spore or more, commonly deciduous; mesospores commonly intermixed.

ON SOLANACEAE:
Solanum tuberosum L., Costa Rica.
TYPE LOCALITY: Volcán de Irazú, Costa Rica, on *Solanum tuberosum*.
DISTRIBUTION: Mountains of Costa Rica; also in Ecuador, South America.

100. **Micropuccinia acrophila** (Peck) Arthur & Jackson.

Puccinia acrophila Peck, Bot. Gaz. **6**: 227. 1881.
Dicaeoma acrophilum Kuntze, Rev. Gen. **3**[3]: 467. 1898.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, solitary, or few and crowded on purplish spots 3–8 mm. across, roundish, large, 0.4–1.5 mm. in diameter, long covered by the thin polished epidermis, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 16–21 by 24–34 μ, rounded above and below, slightly or not constricted

at septum; wall cinnamon-brown, 1.5–2.5 μ thick, very slightly thickened over pore of each cell, 3–3.5 μ, finely and closely verrucose; pedicel short, colorless, one half length of spore, commonly deciduous.

ON SCROPHULARIACEAE:
Besseya Ritteriana (Eastw.) Rydb. (*Synthyris Ritteriana* Eastw.), Colorado.
Besseya rubra (Dougl.) Rydb. (*Synthyris rubra* Benth.), Montana.
Synthyris laciniata (A. Gray) Rydb., Utah.
Synthyris pinnatifida S. Wats., Utah.
TYPE LOCALITY: Utah, on *Synthyris pinnatifida*.
DISTRIBUTION: Southern Montana to Utah and central Colorado.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 17, f. 240.*

101. **Micropuccinia Clintonii** (Peck) Arthur & Jackson.

Puccinia Clintonii Peck, Ann. Rep. N. Y. State Mus. **28**: 61. 1876.
Dicaeoma Clintonii Kuntze, Rev. Gen. **3**[3]: 468. 1898.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, rarely epiphyllous, usually scattered and solitary on discolored, often sunken spots, round, large, 0.5–1.5 mm. across, the resting form tardily naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous, the germinating form compact, pulvinate, at first light cinnamon-brown, becoming cinereous by abundant germination, ruptured epidermis not conspicuous; teliospores ellipsoid, oblong, or broadly clavate, 15–18 by 26–36 μ, rounded or obtuse above, rounded or narrowed below, usually strongly constricted at septum; wall golden-brown or nearly colorless in the germinating form, cinnamon-brown in the resting form, 1.5–2 μ thick, thickened above, often with sub-hyaline umbo, 3–6 μ, very finely striate-verrucose in longitudinal lines, germinating form often smooth; pedicel colorless, fragile, equaling spore, commonly deciduous.

ON SCROPHULARIACEAE:
Elephantella groenlandica (Retz.) Rydb. (*Pedicularis groenlandica* Retz.), Idaho.
Pedicularis bracteosa Benth., Colorado, Oregon; Alberta.
Pedicularis canadensis L., Michigan, New York, Wisconsin.
Pedicularis fluviatilis A. Heller, New Mexico.
Pedicularis racemosa Dougl., Oregon; Alberta.
TYPE LOCALITY: Goat Island, [Niagara Falls,] New York, on *Pedicularis* [*canadensis*].
DISTRIBUTION: Northwestern New York to Oregon and British Columbia, and one locality in the mountains of New Mexico.
EXSICCATI: Barth. Fungi Columb. *3063, 5054;* Barth. N. Am. Ured. *30.*

102. **Micropuccinia rhaetica** (Ed. Fisch.) Arthur & Jackson.

Puccinia rhaetica Ed. Fisch. Bull. Herb. Boiss. **7**: 420. 1899.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, scattered or occasionally gregarious, large, roundish, 1–2 mm. across, somewhat tardily naked, pulverulent, chestnut-brown, ruptured epidermis cinereous and persistent; teliospores ellipsoid, oblong, or obovate, 16–20 by 30–40 μ, rounded or obtuse above, rounded or occasionally slightly narrowed below, not or slightly constricted at septum; wall light cinnamon-brown, 1.5–3 μ thick, thickened above, 3–5 μ, in part by a sub-hyaline umbo, similarly thickened over pore of lower cell at septum, from nearly smooth to distinctly but minutely verrucose-rugose, especially in upper half; pedicel colorless, fragile, equaling spore but commonly broken off close to spore.

ON SCROPHULARIACEAE:
Veronica Cusickii A. Gray, Washington.
TYPE LOCALITY: Val Zeynina, near Lavin, Switzerland, on *Veronica bellidioides*.
DISTRIBUTION: Cascade Mountains in Washington; also in mountains of central Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**[2]: *f. 238*; Fl. Ital. Crypt. Ured. *f. 60d.*

103. **Micropuccinia Chelonis** (Dietel & Holway) Arthur & Jackson.

Puccinia Chelonis Dietel & Holway; Dietel, Hedwigia **36**: 297. 1897.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, rarely epiphyllous, closely gregarious on purplish spots 5–15

mm. across, sometimes confluent, especially in center, often arranged in concentric manner near margin of groups, large, 1–2 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid or oblong, 20–26 by 32–38 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, not or very slightly thickened over pores, appearing smooth in water, obscurely verrucose-rugose when dry; pedicel colorless, short, deciduous.

ON SCROPHULARIACEAE:
Chelone nemorosa Dougl., Oregon, Washington.
TYPE LOCALITY: Chiquash Mountains, Skamania county, Washington, on *Chelone nemorosa*.
DISTRIBUTION: Mountains of southern Washington and adjacent Oregon.
EXSICCATI: Barth. N. Am. Ured. *128*.

104. **Micropuccinia Pentstemonis** (Peck) Arthur & Jackson.

Puccinia Pentstemonis Peck, Bull. Torrey Club **12**: 35. 1885.
Puccinia mexicana Dietel & Holway; Holway, Bot. Gaz. **24**: 33. 1897.
Puccinia circinans Ellis & Ev. Bull. Torrey Club **27**: 61. 1900. Not *P. circinans* Fuckel, 1870, nor Dietel, 1897.
Puccinia Toumeyi Sydow; Sacc. Syll. Fung. **16**: 299. F 1902.
Puccinia chasmatis Ellis & Ev. Jour. Myc. **8**: 15. My 1902.

O. Pycnia not seen.

III. Telia amphigenous and caulicolous, usually hypophyllous, densely gregarious in groups 5–15 mm. across, on discolored often purplish spots, usually distinct but occasionally confluent in center, often arranged in circinate manner at margin, small, round, 0.2–0.5 mm. across, compact, rarely pulvinate, somewhat tardily naked, blackish-brown, pulvinate sori becoming cinereous by germination, ruptured epidermis conspicuous; teliospores ellipsoid, oblong, or obovate, 18–26 by 32–48 μ, rounded or obtuse above, rounded or narrowed below, not or slightly constricted at septum; wall cinnamon-brown, 1.5–3 μ, darker and thickened at apex, 5–10 μ, smooth; pedicel colorless or slightly tinted next to spore, firm, once to twice length of spore.

This species is correlated with *Dicaeoma Andropogonis* (Schw.) Kuntze, corresponding in part to the race having aecia on *Scrophulariaceae*.

ON SCROPHULARIACEAE:
Penstemon azureus Benth., California.
Penstemon Bridgesii A. Gray, California.
Penstemon campanulatus Willd., Hidalgo, Mexico (state).
Penstemon deustus Dougl., California, Wyoming.
Penstemon diffusus Dougl., Oregon.
Penstemon linarioides A. Gray, Arizona.
Penstemon Roezli Regel, California.
Penstemon spectabilis Thurber, Arizona, California.
TYPE LOCALITY: Arizona, on *Penstemon linarioides*.
DISTRIBUTION: Eastern Oregon to Western Wyoming and southward in the mountains through Mexico.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 16, f. 239*.
EXSICCATI: Barth. N. Am. Ured. *1259;* D. Griff. W. Am. Fungi *393*.

105. **Micropuccinia Seymeriae** (Burrill) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Seymeriae Burrill, Bot. Gaz. **9**: 189. 1884.
Dicaeoma Seymeriae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia Gerardiae Sydow, Ann. Myc. **1**: 18. 1903.
Dasyspora Seymeriae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, rarely epiphyllous, densely gregarious and more or less confluent in orbicular groups 3–10 mm. across, on discolored spots, or elongate and causing some hypertrophy when caulicolous, roundish, small, 0.2–0.5 mm. across, somewhat tardily naked, compact, slightly pulvinate, chestnut-brown, ruptured epidermis usually noticeable; teliospores ellipsoid, oblong, or clavate, 16–20 by 26–38 μ, rounded or obtuse above, rounded or occasionally narrowed below, not or very slightly constricted at septum; wall dark cinnamon-brown, 1.5–3 μ thick, gradually thickened at apex, 5–9 μ, smooth; pedicle firm, colorless, once to twice length of spore.

This species is correlated with *Dicaeoma Andropogonis* (Schw.) Kuntze, corresponding in part to the race having aecia on *Scrophulariaceae.*

ON SCROPHULARIACEAE:
Agalinis Besseyaia Britton (*Gerardia tenuifolia macrophylla* Benth., *G. Besseyana* Britton), Illinois.
Dasistoma macrophylla (Nutt.) Raf. (*Seymeria macrophylla* Nutt., *Afzelia macrophylla* Kuntze), Illinois, Indiana, Kansas, Nebraska, Ohio.
TYPE LOCALITY: Bloomington, Illinois, on *Seymeria macrophylla.*
DISTRIBUTION: Upper Mississippi Valley from Northern Ohio to Eastern Kansas and Nebraska.
EXSICCATI: Barth. Fungi Columb. *3368;* Ellis & Ev. N. Am. Fungi *1835, 2249;* Kellerm. Ohio Fungi *176;* Sydow, Ured. *1717.*

106. **Micropuccinia nesodes** (Arth. & Holway) Arthur & Jackson.

Puccinia nesodes Arth. & Holway; Arth. Mycologia **10**: 138. 1918.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, more or less confluent in circular groups 1–6 mm. across, early naked, round, 0.1–0.5 mm. in diameter, pulvinate, chestnut-brown, becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores obovoid or ellipsoid, 14–19 by 26–40 μ, rounded above, narrowed or rounded below, slightly constricted at septum; wall golden- or light cinnamon-brown, thin, 1.5–2.5 μ, gradually thickened above to 3–7 μ, smooth; pedicel colorless, once or twice length of spore.

ON SCROPHULARIACEAE:
Castilleja communis Benth., Guatemala.
Castilleja tenuiflora Benth., Guatemala.
Lamourouxia Gutierrezii Oerst., Costa Rica.
Lamourouxia viscosa H.B.K., Costa Rica.
TYPE LOCALITY: Tres Rios, near San José, Costa Rica, on *Lamourouxia viscosa.*
DISTRIBUTION: Central America.

107. **Micropuccinia Veronicarum** (DC.) Arthur & Jackson.

Puccinia Veronicarum DC. Fl. Fr. **2**: 594. 1805.
Puccinia Veronicarum fragilipes Körn. Hedwigia **16**: 1. 1877.
Puccinia Veronicarum persistens Körn. Hedwigia **16**: 1. 1877.
Puccinia Veronicae Wint. in Rab. Krypt.-Fl. I^1: 166. 1881. Not *P. Veronicae* Schroet. 1879, nor Schum. 1880.
Dicaeoma Veronicarum Kuntze, Rev. Gen. 3^3: 471. 1898.
Leptopuccinia Veronicarum Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, scattered and solitary or more commonly gregarious and more or less confluent in small groups 1–3 mm. across, small, 0.2–0.5 mm. in diameter, early naked, pulverulent sori chestnut-brown, often arranged in concentric manner around a central pulvinate sorus, pulvinate sori cinnamon-brown, becoming cinereous by germination; teliospores ellipsoid, oblong, or oblong-terete, 16–19 by 32–45 μ, rounded or obtuse above, rounded or more commonly narrowed below, usually noticeably constricted at septum; wall golden- or light cinnamon-brown, 1.5–3 μ thick, paler and thickened above, 4–7 μ, smooth; pedicel colorless, short, deciduous or in pulvinate sori equaling spore.

ON SCROPHULARIACEAE:
Leptandra virginica (L.) Nutt. (*Veronica virginica* L.), Iowa, Wisconsin.
TYPE LOCALITY: France, on *Veronica Ponae.*
DISTRIBUTION: Iowa and Wisconsin; also in Europe.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **8**: *pl. 12, f. 12–17;* Beitr. Krypt. Schweiz 2^2: *f. 236;* Fl. Ital. Crypt Ured. *f. 60a, b;* Bull. Lab. Nat. Hist. Univ. Iowa 3^2: *pl. 2, f. 9a, b;* Grove, Brit. Rust Fungi *f. 120.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *9a, b;* Barth. N. Am. Ured. *1675.*

108. **Micropuccinia albulensis** (P. Magn.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Veronicae Schum.; Wint. Hedwigia **19**: 164. 1880. Not *P. Veronicae* Schroet. 1879.
Puccinia albulensis P. Magn. Ber. Deuts. Bot. Ges. **8**: 169. 1890.
Dicaeoma albulense Kuntze, Rev. Gen. 3^3: 467. 1898.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, chiefly from a distributed mycelium, evenly disposed over considerable areas of internodes and leaves, small, round, 0.2–0.4 mm. across,

occasionally confluent, early naked, pulverulent, or compact in germinating sori, ruptured epidermis not conspicuous, cinnamon-brown, becoming cinereous by germination, more rarely solitary or gregarious and then usually larger, 0.5–0.8 mm. across, pulverulent, with ruptured epidermis conspicuous; teliospores ellipsoid or somewhat fusiform, 14–18 by 24–34 μ, rounded or obtuse above, rounded or narrowed below, not or slightly constricted at septum; wall golden- or light cinnamon-brown, thin, 1–1.5 μ, thickened 3–5 μ above, smooth or very minutely verrucose-rugose, best observed when dry; pedicel colorless, short, deciduous, or in pulvinate sori twice length of spore.

ON SCROPHULARIACEAE:
Veronica Cusickii A. Gray, Washington.
Veronica Wormskjoldii R. & S. (*V. alpina unalaschkensis* Cham. & Schlecht.), Colorado, Montana, Oregon, Utah, Wyoming; Greenland; British Columbia.
TYPE LOCALITY: Canton Graubunden, Switzerland, on *Veronica alpina*.
DISTRIBUTION: Western Colorado and central Utah northward to southern British Columbia, and in Greenland; also in Europe.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **8**: *pl. 12, f. 1–11;* Beitr. Krypt. Schweiz **2**²: *f. 237.*
EXSICCATI: Ellis & Ev. Fungi Columb. *1462;* Garrett, Fungi Utah. *94;* D. Griff. W. Am. Fungi *357.*

109. **Micropuccinia Wulfeniae** (Dietel & Holway) Arthur & Jackson.

Puccinia Wulfeniae Dietel & Holway; Dietel, Erythea **3**: 79. 1895.
Puccinia Synthyridis Ellis & Ev. Bull. Torrey Club **27**: 61. 1900.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, at first chiefly hypophyllous, solitary or densely gregarious and often confluent in small groups 2–5 mm. across, on discolored spots, becoming scattered on both surfaces of leaf, round, 0.2–0.8 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis usually conspicuous, germinating sori pulvinate, becoming cinereous; teliospores oblong or ellipsoid, 14–18 by 26–35 μ, rounded or obtuse above, rounded below, strongly constricted at septum; wall golden-brown, 1–1.5 μ thick, abruptly thickened at apex by a sub-hyaline papilla over pore, 4–6 μ, obscurely verrucose or verrucose-rugose, especially in the upper part, best observed when dry, or smooth; pedicel colorless, short, deciduous, or in pulvinate sori once to once and a half length of spore; mesospores occasionally intermixed.

ON SCROPHULARIACEAE:
Besseya rubra (Dougl.) Rydb. (*Synthyris rubra* Benth.), Washington.
Besseya wyomingensis (A. Nelson) Rydb. (*Wulfenia wyomingensis* A. Nelson, *Synthyris wyomingensis* A. Heller), Wyoming.
Synthyris cordata (A. Gray) A. Heller (*Wulfenia cordata* A. Gray), California.
Synthyris major (Hook.) A. Heller, Idaho.
Synthyris reniformis (Dougl.) Benth. (*Wulfenia reniformis* Dougl.), Idaho.
Synthyris rotundifolia A. Gray, California, Oregon.
TYPE LOCALITY: Ukiah, Mendocino County, California, on *Wulfenia cordata*.
DISTRIBUTION: Northwestern Wyoming to eastern Washington and central California.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 17, f. 241, 244.*
EXSICCATI: Ellis & Ev. Fungi Columb. *1465.*

110. **Micropuccinia depallens** (Arth. & Holway) Arthur & Jackson.

Puccinia depallens Arth. & Holway; Arth. Mycologia **10**: 139. 1918.

O. Pycnia epiphyllous, gregarious on discolored areas 2–3 mm. across, light-brown becoming dark-brown, conspicuous, subcuticular, lenticular or low-conic, 128–160 μ in diameter, 48–77 μ high; ostiolar filaments none; pycniospores ellipsoid, colorless, 2.5 by 3–4 μ.

III. Telia hypophyllous, crowded in circles on spots opposite the pycnia, early naked, oval, 0.2–0.4 mm. long, compact, light cinnamon-brown or cinereous from the germinating spores, ruptured epidermis inconspicuous; teliospores terete, 16–27 by 45–96 μ, obtuse or rounded at both ends, slightly or not constricted at septum, which is more or less oblique; wall colorless or slightly tinted, uniformly thin, 1 μ, smooth; pedicel one-half length of spore or nearly equaling it, colorless, firm, broad, thin-walled.

ON BIGNONIACEAE:
Pithecoctenium muricatum DC., Costa Rica; Guatemala.
TYPE LOCALITY: Road to Volcán de Poás, Costa Rica, on *Pithecoctenium muricatum*.
DISTRIBUTION: Central America.

111. **Micropuccinia Elytrariae** (P. Henn.) Arthur & Jackson.

Puccinia Elytrariae P. Henn. Hedwigia **34**: 320. 1895.

O. Pycnia not seen, probably not formed.

III. Telia hypophyllous, gregarious and closely crowded on discolored spots 4–10 mm. across, round, small, 0.1–0.4 mm. in diameter, somewhat tardily naked, compact, somewhat pulvinate, chocolate-brown, ruptured epidermis noticeable; teliospores few, ellipsoid or obovoid, 14–19 by 22–30 μ, rounded above, rounded or narrowed below, not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, darker and slightly thickened above, 5 μ, smooth; pedicel firm, concolorous with base of spore, often slightly inflated above, once to twice and a half length of spore, or deciduous; mesospores predominating, obovoid or ellipsoid, 14–19 by 18–24 μ, rounded above, usually narrowed below.

ON ACANTHACEAE:
Elytraria squamosa (Jacq.) Lindau, Costa Rica.
Elytraria tridentata Vahl, Guerrero, Jalisco, Morelos.
Elytraria sp., Guatemala.
TYPE LOCALITY: Brazil, on *Elytraria crenata*.
DISTRIBUTION: Central Mexico southward into Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 15, f. 213.*

112. **Micropuccinia rubefaciens** (Johans.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia rubefaciens Johans. Bot. Notiser **1886**: 174. 1886.
Dicaeoma rubefaciens Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora rubefaciens Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia rubefaciens Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, solitary or gregarious and more or less confluent in groups 1–10 mm. across, on yellowish spots, large, round or elliptic, 1–2 mm. or larger when confluent, compact, somewhat pulvinate, tardily naked, blackish-brown, ruptured epidermis conspicuous; teliospores oblong or clavate, 16–23 by 38–52 μ, rounded or truncate above, narrowed below, slightly constricted at septum; wall cinnamon-brown, thin at sides, 1.5–2 μ, dark chestnut-brown above and greatly thickened, 10–14 μ, smooth; pedicel colorless, or tinted like base of spore, half length of spore or shorter.

This species is correlated with *Dicaeoma punctatum* (Link) Arth. and *Allodus ambigua* (Alb. & Schw.) Arth. The morphological characters of like stages in the three species are similar or identical, and together with the correspondence in hosts doubtless indicate a common origin.

ON RUBIACEAE:
Galium boreale L. (*G. boreale linearifolium* Rydb.), Alaska, Colorado, Idaho, Iowa, Montana, North Dakota, Oregon, South Dakota, Washington, Wisconsin; Alberta.
Galium californicum Hook. & Arn., California.
TYPE LOCALITY: Jemtland, Sweden, on *Galium boreale*.
DISTRIBUTION: Southern Wisconsin to Colorado and central California, northwestward nearly to Bering Straits, Alaska; also in northern Europe.
ILLUSTRATIONS: Sydow, Monog. Ured. **1**: *pl. 13, f. 196;* Hedwigia **28**: 106. *f. 5.*
EXSICCATI: Barth. N. Am. Ured. *965, 1368, 1865;* Brenckle, Fungi Dak. *16, 244;* Ellis, N. Am. Fungi *1038a;* D. Griff. W. Am. Fungi *294;* Sydow, Ured. *2275.*

113. **Micropuccinia lateritia** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia lateritia Berk. & Curt. Jour. Acad. Phila. II. **2**: 281. 1853.
Puccinia Spermacoces Berk. & Curt. Grevillea **3**: 53. 1874.
Dicaeoma Spermacoceodis Kuntze, Rev. Gen. **3**[3]: 467. 1898.
Dicaeoma lateritium Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Spermacoces Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia Houstoniae Sydow, Hedwigia Beibl. **40**: 126. 1901.
Allodus Houstoniae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Dasyspora lateritia Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, rarely epiphyllous, solitary or more commonly gregarious in groups 0.2–1 cm. across, often circinating, small, round, 0.1–0.4 mm. across, early naked, compact, sometimes pulvinate, less commonly somewhat pulverulent, cinnamon- or chestnut-brown, in germinating sori becoming cinereous, ruptured epidermis not noticeable; teliospores broadly ellipsoid, oblong, or obovoid, 16–23 by 26–40 μ, rounded above, rounded or occasionally somewhat narrowed below, not constricted at septum; wall golden- or chestnut-brown, 2.5–4 μ thick, slightly thickened above, 4–7 μ, smooth; pedicel colorless, often slightly tinted, usually persistent, once to twice length of spore, occasionally longer.

ON RUBIACEAE:

Borreria ocimoides (Burm. f.) DC., Costa Rica.
Borreria laevis (Lam.) Griseb., Jamaica; Cuba; Porto Rico.
Borreria parviflora G. Meyer, St. Croix.
Borreria terminalis Small, Florida.
Borreria verticillata (L.) G. Meyer, Porto Rico.
Bouvardia sp., Morelos.
Coccocypselum hirsutum Bartl., Costa Rica.
Crusea calocephala DC., Guatemala.
Crusea sp., Morelos.
Diodella rigida (Cham. & Schlecht.) Small (*Diodia rigida* Cham. & Schlecht.), Florida; Colima; Cuba; Haïti; Porto Rico.
Diodia littoralis Sw., Porto Rico.
Diodia maritima Thonn., Porto Rico.
Diodia sp., Veracruz; Guatemala.
Ernodea angusta Small, Florida.
Ernodea littoralis Sw., Florida; Bahamas; Mona Island; Porto Rico.
Hemidiodia ocimifolia (Willd.) K. Schum., Cuba.
Houstonia angustifolia Michx., Texas.
Mitracarpus portoricensis Urban, Porto Rico.
Spermacoce glabra Michx., Alabama, Louisiana.
Spermacoce Haenkeana Hemsl., Michoacan.
Spermacoce podocephala DC., Guatemala.
Spermacoce Pringlei S. Wats., Oaxaca.
Spermacoce riparia Cham. & Schlecht., Porto Rico.
Spermacoce tenuior (L.) Lam., Jamaica; Porto Rico; St. Croix.

TYPE LOCALITY: Surinam, on *Spermacoce* sp., now interpreted as probably *Borreria laevis*.

DISTRIBUTION: Along the Gulf of Mexico from Florida to Texas and southward through Central America and the West Indies; also in South America.

ILLUSTRATION: Bot. Jahrb. **17**: *pl. 12, f. 1, 2.*

EXSICCATI: Barth. Fungi Columb. *2455, 4854;* Barth. N. Am. Ured. *44, 153, 1555, 1557;* Ellis & Ev. N. Am. Fungi *1841;* Rav. Fungi Car. **3**: *93.*

114. **Micropuccinia Linkii** (Klotzsch) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Linkii Klotzsch, Linnaea **8**: 490. 1833.
Puccinia Pringlei Peck, Bot. Gaz. **6**: 275. 1881.
Dicaeoma Linkii Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Pringlei Kuntze, Rev. Gen. **3**[3]: 470. 1898.

O. Pycnia unknown.

III. Telia amphigenous on petioles and veins, chiefly epiphyllous, when on blade of leaf deep-seated and gregarious on thickened nearly orbicular purplish spots 0.5–1 cm. across, or when on veins and petioles elongated to 2 cm., causing some hypertrophy, roundish, 0.2–0.5 mm. across or larger through coalesence, early naked, somewhat pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores ellipsoid, 18–22 by 32–44 μ, rounded or obtuse above, rounded or somewhat narrowed below, not or slightly constricted at septum; wall chestnut-brown, 2–3 μ thick, thickened above by a broad sub-hyaline conic umbo, 5–7 μ, similarly thickened over pore of lower cell at septum, striate with prominent sparsely distributed sub-hyaline cylindric papillae, 1–2 mm. high, arranged in 3–5 longitudinal or oblique lines; pedicel colorless, usually deciduous or equaling spore.

ON CAPRIFOLIACEAE:

Viburnum pauciflorum Pylaie, Idaho, Michigan, Montana, Washington; Quebec.

TYPE LOCALITY: America borealis [Canada], on *Viburnum [pauciflorum]*.

DISTRIBUTION: In proximity to the international boundary from eastern Canada to the Pacific coast.

ILLUSTRATIONS: Linnaea **8**: *pl. 3;* Sydow, Monog. Ured. **1**: *pl. 13, f. 189.*

EXSICCATI: Barth. N. Am. Ured. *550;* Rel. Farl. *259.*

115. **Micropuccinia Symphoricarpi** (Hark.) Arthur & Jackson.

Puccinia Symphoricarpi Hark. Bull. Calif. Acad. **1**: 35. 1884.
Dicaeoma Symphoricarpi Kuntze, Rev. Gen. **3**[3]: 470. 1898.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous, closely gregarious and more or less confluent on yellowish spots 0.4–0.8 cm. across, often causing some hypertrophy, roundish, 0.4–1 mm. across, tardily naked, compact, pulvinate, blackish-brown, long covered by the cinereous epidermis; teliospores ellipsoid, oblong, or oblong-clavate, often somewhat irregular, 18–24 by 34–56 μ, rounded or obtuse above, rounded, truncate, or narrowed to the pedicel below, slightly constricted at septum; wall cinnamon-brown, 1.5–3 μ thick, thickened above, 7–13 μ, somewhat thickened over pore of lower cell at septum, smooth; pedicel firm, tinted, equaling spore or shorter; mesospores occasionally intermixed.

This species is correlated with *Dicaeoma abundans* (Peck) Arth. & Fromme, the telial characters of the two species being similar or identical, and the hosts of the short-cycled form corresponding with the aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

On Caprifoliaceae:
Symphoricarpos albus (L.) Blake (*S. racemosus* Michx.), California, Montana, Oregon, Washington; British Columbia.
Symphoricarpos mollis Nutt., California.
Type locality: Mt. Tamalpais, California, on *Symphoricarpos mollis*.
Distribution: Mountains of British Columbia to central California and western Montana.
Exsiccati: Barth. Fungi Columb. *4867;* Barth. N. Am. Ured. *266, 574, 1373, 1873, 2168;* Ellis, N. Am. Fungi *1057;* Ellis & Ev. Fungi Columb. *488;* Sydow, Ured. *885*.

116. **Micropuccinia Apocyni** (Dietel & Holway) Arthur & Jackson.

Puccinia Apocyni Dietel & Holway; Holway, Bot. Gaz. **24**: 33. 1897.

O. Pycnia unknown.

III. Telia hypophyllous, numerous, gregarious and crowded in groups 3–8 mm. across, on yellowish spots, roundish, small, 0.2–0.4 mm. in diameter, early naked, compact, pulvinate cinnamon-brown becoming cinereous by germination, ruptured epidermis not noticeable; teliospores cylindric or clavate-cylindric, 16–19 by 36–48 μ, obtuse or acute above, rounded or more commonly narrowed to pedicel below, strongly constricted at septum; wall golden-brown, 1–1.5 μ thick, thickened above, 8–12 μ, smooth; pedicel fragile, colorless, short.

On Caprifoliaceae:
Lonicera pilosa H.B.K., Mexico (state).
Type locality: Eslava, near City of Mexico, on "*Apocynum androsaemifolium,*" error for *Lonicera pilosa*.
Distribution: Vicinity of the type locality.

117. **Micropuccinia Adoxae** (Hedw. f.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Adoxae Hedw. f.; DC. Fl. Fr. **2**: 220. 1805.
Dicaeoma Adoxae S. F. Gray, Nat. Arr. Brit. Pl. **1**: 543. 1821.
Dasyspora Adoxae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous, from a perennial mycelium, gregarious in groups of various size, often scattered on swollen petioles and stems, round, 0.5 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis somewhat noticeable; teliospores ellipsoid or oblong, 15–20 by 24–38 μ, rounded or somewhat obtuse above with a prominent hyaline umbo covering the pore, rounded, obtuse, or narrowed below, scarcely constricted at septum; wall cinnamon-brown, moderately thin, 1.5–2 μ, slightly thickened above, 3–5 μ, smooth; pedicel colorless, fragile, about length of spore, usually deciduous.

This species is correlated with *Dicaeoma Nolitangeris* (Corda) Arth., the telia of the two species having the same morphological characters, and the host of the short-cycled form being the same as that of the aecia of the heteroecious form. This agreement doubtless indicates a common origin.

ON ADOXACEAE:
Adoxa moschatellina L., Colorado, Utah.
TYPE LOCALITY: Near Geneva, Switzerland, on *Adoxa moschatellina*.
DISTRIBUTION: Central Colorado to southeastern Utah; also in Europe.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. 9: *pl. 3, f. 12;* Beitr. Krypt. Schweiz 2²: *f. 111;* Grove, Brit. Rust Fungi *f. 112.*
EXSICCATI: Clements, Crypt. Form. Colo. *133;* Ellis & Ev. N. Am. Fungi *2247;* Garrett, Fungi Utah. *211.*

118. **Micropuccinia Campanulae** (Carm.) Arthur & Jackson.

Puccinia Campanulae Carm.; Berk. in Smith, Engl. Fl. 5²: 356. 1836.
Dicaeoma Campanulae Kuntze, Rev. Gen. 3³: 468. 1898.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous and caulicolous, scattered or frequently gregarious, round, 0.4–0.8 mm. across, tardily naked, pulverulent, cinnamon-brown, ruptured epidermis persistent and conspicuous; teliospores oblong or ellipsoid, 14–18 by 26–38 μ, rounded or obtuse above and below, somewhat constricted at septum; wall golden-brown, moderately thin, 1.5–2.5 μ, thickened above, 4–6 μ, often with sub-hyaline apiculus, smooth; pedicel very delicate, colorless, half length of spore, more often deciduous.

ON CAMPANULACEAE:
Campanula rotundifolia L., New York.
Campanula Scouleri Hook., Oregon.
Campanula uniflora L., Greenland.
TYPE LOCALITY: Appin, Scotland, on *Campanula* sp.
DISTRIBUTION: Locally in New York, Oregon, and Greenland; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2²: *f. 136;* Jahrb. Nass. Ver. Nat. 23–24: *pl. 2, f. 14;* Sydow, Monog. Ured. 1: *pl. 12, f. 182;* Grove, Brit. Rust Fungi *f. 111.*

119. **Micropuccinia Lobeliae** (W. Gerard) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia microsperma Berk. & Curt.; M. A. Curt. Cat. Pl. N. Car. 121, hyponym. 1867.
Puccinia Lobeliae W. Gerard; Peck, Bull. Buffalo Soc. Nat. Sci. 1: 66. 1873.
Puccinia microsperma Berk. & Curt. Grevillea 3: 55. 1874.
Dicaeoma microspermum Kuntze, Rev. Gen. 3³: 469. 1898.
Dicaeoma Lobeliae Arth. Proc. Ind. Acad. Sci. 1898: 183. 1899.
Dasyspora Lobeliae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, rarely epiphyllous, closely gregarious in groups 0.5–1.5 cm. across, occasionally becoming locally systemic and covering large areas of the leaf-surface, small, round, 0.2–0.5 mm. across, early naked, pulvinate, cinnamon- or chestnut-brown, becoming cinereous by germination, ruptured epidermis not conspicuous; teliospores oblong or cylindric, 14–18 by 30–44 μ, obtuse above and below or occasionally narrowed to pedicel, constricted at septum; wall nearly colorless or golden-brown, thin, 1–1.5 μ, thickened at apex, 3–7 μ, smooth; pedicel very delicate, colorless, equaling spore or more commonly deciduous.

ON LOBELIACEAE:
Lobelia Kalmii L., New York.
Lobelia puberula Michx., Alabama, North Carolina, South Carolina.
Lobelia syphilitica L., Arkansas, Delaware, Illinois, Indiana, Iowa, Kentucky, Missouri, Nebraska, New York, Pennsylvania, West Virginia, Wisconsin; Ontario.
TYPE LOCALITY: Poughkeepsie, New York, on *Lobelia syphilitica.*
DISTRIBUTION: Northern New York to South Carolina, and westward to central Nebraska and northwestern Arkansas.
ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa 3²: *pl. 1, f. 3.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *3;* Barth. Fungi Columb. *2564, 2858, 3257;* Barth. N. Am. Ured. *46, 2253;* Ellis, N. Am. Fungi *253;* Ellis & Ev. Fungi Columb. *261;* Sydow, Ured. *774, 2524.*

120. **Micropuccinia Xanthii** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club 48: 42. 1921.

Puccinia Xanthii Schw. Schr. Nat. Ges. Leipzig 1: 73. 1822.
Puccinia Xanthii Ambrosiae Berk. & Rav.; Rav. Fungi Car. 3: 91, hyponym. 1855.
Dasyspora Xanthii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia Xanthii Sydow, Ann. Myc. 20: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, less commonly epiphyllous, rarely caulicolous, closely gregarious

and often confluent in groups 0.1–1 cm. across, on yellowish or purplish spots, small, round, 0.2–0.5 mm. across, early naked, compact, at first punctate becoming pulvinate, blackish-brown becoming cinereous by germination, ruptured epidermis not conspicuous; teliospores oblong, cylindric or clavate, often somewhat irregular, 13–19 by 35–55 μ, rounded, obtuse, or acute above, narrowed below, usually noticeably constricted at septum; wall golden- or cinnamon-brown, 1.5–2.5 μ thick, usually darker and thickened above, 4–9 μ, smooth; pedicel colorless or tinted like spore, firm, one half length of spore or shorter.

This species is correlated with *Dicaeoma canaliculatum* (Schw.) Kuntze, the telial characters of the two species being similar or identical, and the hosts of the short-cycled species corresponding with the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin of the two species.

ON AMBROSIACEAE:

Ambrosia elatior L. (*A. artemisiaefolia* A. Gray not L.), Florida, Kansas, Nebraska, South Carolina, Texas.
Ambrosia media Rydb., Colorado.
Ambrosia psilostachya DC., Colorado, Kansas, Montana, Nebraska, South Dakota.
Ambrosia trifida L., Arkansas, Colorado, Delaware, Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, New York, Oklahoma, Pennsylvania, South Dakota, Texas, Virginia, West Virginia, Wisconsin; Ontario.
Xanthium acerosum Greene, Minnesota, North Dakota.
Xanthium cenchroides Millsp. & Sherff, Colorado.
Xanthium chinense Mill. (*X. longirostre* Wallr., *X. glabratum* Britton, *X. canadense* Am. Auth. not Mill., *X. americanum* Am. Auth. not Walt., *X. strumarium* Am. Auth. not L.), Alabama, Arkansas, Indiana, Kansas, Kentucky, New York, North Carolina, Oklahoma, Pennsylvania, Virginia; Ontario; Cuba; Porto Rico; Santo Domingo.
Xanthium echinatum Murr., New York.
Xanthium inflexum Mackenzie & Bush, Missouri.
Xanthium italicum Mor. (*X. commune* Britton, *X. glanduliferum* Greene), Arkansas, California, Colorado, Indiana, Iowa, Nebraska, New Mexico, New York, North Dakota, Oklahoma, Pennsylvania, South Dakota; Querétaro; Cuba.
Xanthium pennsylvanicum Wallr. (*X. californicum* Greene, *X. saccharatum* Wallr.), California, Colorado, Indiana, Michigan, Missouri, Nebraska, Oklahoma, Tennessee; Cuba.
Xanthium spinosum L., Indiana.
Xanthium sp., Arizona, Delaware, Florida, Idaho, Illinois, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Montana, New Jersey, Ohio, Rhode Island, South Carolina, Texas, Washington, West Virginia, Wisconsin, Wyoming; Jalisco, Morelos, Oaxaca.

TYPE LOCALITY: North Carolina, on *Xanthium strumarium*.

DISTRIBUTION: Canada and the United States east of the Rocky Mountains southward through the West Indies, and from central California to southern Mexico; also in Hawaii.

ILLUSTRATIONS: Ann. Rep. N. Y. State Mus. **25**: *pl. 2, f. 22;* Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 10a, b.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *10a–c;* Barth. Fungi Columb. *2678, 2779, 2780, 2781, 2866, 2901, 3075, 3272, 3375, 3676, 3975, 4576, 4679, 4982;* Barth. N. Am. Ured. *74, 175, 279, 375, 376, 481, 674, 675, 777, 778, 1085, 1276, 1378, 1576, 1577, 1578, 1678, 1781, 1782, 1880, 1978, 2080, 2081, 2177, 2276, 2277, 2476, 2634;* Brenckle, Fungi Dak. *470;* Carleton, Ured. Am. *34;* Clements, Crypt. Form. Colo. *327, 582;* Ellis, N. Am. Fungi *264;* Ellis & Ev. Fungi Columb. *344, 1456, 1582, 1871;* Ellis & Ev. N. Am. Fungi *1853;* D. Griff. W. Am. Fungi *73, 73a, 82;* Kellerm. Ohio Fungi *32;* Kellerm. & Swingle, Kans. Fungi *17a, b;* Rav. Fungi Am. *730;* Rav. Fungi Car. **1**: *95*, **3**: *91;* Seym. & Earle, Econ. Fungi *322a, b;* Shear, N. Y. Fungi *120;* Sydow, Ured. *487, 1033, 1087, 1185;* Thümen, Myc. Univ. *33.*

121. **Micropuccinia rotundata** (Dietel) Arthur & Jackson.

Puccinia rugosa Speg. Anal. Soc. Ci. Argent. **17**: 92. 1884. Not *P. rugosa* Billings, 1871.
Puccinia rotundata Dietel, Hedwigia **36**: 32. 1897.
Dicaeoma rugosum Kuntze, Rev. Gen. **3**[3]: 470. 1898.

O. Pycnia amphigenous, among the telia, few, gregarious, noticeable, yellowish, globoid or somewhat flask-shaped, 125–130 μ in diameter; ostiolar filaments not extruded.

III. Telia amphigenous or chiefly epiphyllous and caulicolous, numerous, crowded on yellowish spots in orbicular or somewhat irregular areas 0.5–5 mm. across, roundish, 0.2–0.5 mm. in diameter, tardily naked, becoming pulverulent, reddish-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 18–26 by 30–42 μ, rounded at both ends, occasionally tapering below, not or slightly constricted at septum, cells easily separating; wall cinnamon-brown, uniformly thick, 2.5–3 μ, occasionally thickened 4–5 μ over each pore, located about half way from apex to septum in upper cell and similarly placed between pedicel and septum in lower cell, noticeably and evenly rugose; pedicel short, colorless, deciduous.

This species is correlated with *Bullaria inaequata* (Jackson & Holway) Arth. & Mains,

the pycnia and telia of the two species being morphologically similar, and the hosts the same. The two species are undoubtedly of the same origin.

ON CARDUACEAE:
Vernonia patens H.B.K., Costa Rica.
Vernonia sp., Panama.
TYPE LOCALITY: Paraguarí, Paraguay, on Compositae (Verbesinae?), now interpreted as *Vernonia* sp.
DISTRIBUTION: Central America; also in South America.

122. **Micropuccinia discreta** (Jackson & Holway) Arthur & Jackson.

Puccinia discreta Jackson & Holway; H. S. Jackson, Bot. Gaz. **65**: 309. 1918.

O. Pycnia epiphyllous, surrounded by the telia, few, gregarious, noticeable, golden-brown fading to dark-brown, globose or depressed-globoid, 90–100 by 100–130 μ; ostiolar filaments short.

III. Telia chiefly epiphyllous, densely gregarious and confluent in groups 0.5–3 mm. across, on yellowish hypertrophied spots, often arranged in a concentric manner around the pycnia, roundish or somewhat irregular, 0.2–0.6 mm. across, early naked, at first punctiform, becoming pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 18–22 by 32–42 μ, rounded at both ends, cells easily separating, strongly constricted at septum; wall dark cinnamon-brown, uniform in thickness, 2.5–3.5 μ, minutely verrucose-rugose, often in lines extending in various directions, the pore of apical cell placed about half way from apex to septum, similarly in lower cell; pedicel colorless, usually deciduous.

ON CARDUACEAE:
Vernonia stellaris Llave & Lex. (*V. Deppeana* Less.), Costa Rica; Guatemala.
TYPE LOCALITY: San José, Costa Rica, on *Vernonia Deppeana*.
DISTRIBUTION: Central America.

123. **Micropuccinia paupercula** (Arth.) Arthur & Jackson.

Puccinia paupercula Arth. Bot. Gaz. **40**: 206. 1905.
Puccinia Elephantopodis-spicati Pat. Bull. Soc. Myc. Fr. **28**: 140. 1912.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in orbicular groups 1–4 mm. across, minute, punctiform, confluent, soon naked, compact, chocolate-brown, usually cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong or lance-oblong, 15–17 by 39–50 μ, acute or obtuse at apex, obtuse or narrowed at base, slightly or not constricted at septum; wall chestnut-brown, smooth, rather thin, 1–2 μ, thicker at apex, 7–9 μ, concolorous; pedicel colored like the spore, firm, one half length of spore or less.

ON CARDUACEAE:
Pseudelephantopus spicatus (Juss.) Rohr (*Distreptus spicatus* Cass., *Elephantopus spicatus* Juss.), Veracruz; Costa Rica; Guatemala; Panama.
TYPE LOCALITY: Veracruz, Mexico, on *Elephantopus spicatus*.
DISTRIBUTION: Southern Mexico and Central America.

124. **Micropuccinia tolimensis** (Mayor) Arthur & Jackson.

Puccinia tolimensis Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 516. 1913.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious and often confluent, in orbicular groups 2–5 mm. across, on purplish spots, punctiform, 0.1–0.2 mm. across, tardily naked, compact, pulvinate, chocolate-brown, ruptured epidermis conspicuous; teliospores clavate or oblong, 16–23 by 40–58 μ; apex variable, rounded, truncate, or obtuse, base narrowed or rarely somewhat rounded, usually constricted at septum; wall golden- or light cinnamon-brown, thin, 1 μ, thickened and darker at apex, 3–7 μ, smooth; pedicel fragile, short, colorless or tinted like the spore.

This species is correlated with *Dicaeoma Eleocharidis* (Arth.) Kuntze, the telial characters of the two species being essentially the same and the hosts of the short-cycled species corresponding with the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Eupatorium pansamalense B. L. Robinson, Guatemala.
Eupatorium urticaefolium Reichard (*E. ageratoides* L. f.), New York.
TYPE LOCALITY: Central Andes, Soledad, Tolima, Colombia, on *Eupatorium* sp.
DISTRIBUTION: Guatemala and one locality in central New York; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. 5: *f. 40.*

125. **Micropuccinia praemorsa** (Dietel & Holway) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia praemorsa Dietel & Holway; Holway, Bot. Gaz. 31: 332. 1901.
Dasyspora praemorsa Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia praemorsa Sydow, Ann. Myc. 20: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded and partly confluent in more or less circular groups 1–4 mm. across, small, 0.2–0.4 mm. across, early naked, compact, pulvinate, chocolate-brown, ruptured epidermis not conspicuous; teliospores oblong or clavate, somewhat irregular, 18–24 by 45–64 μ, rounded or acute above, narrowed below, somewhat constricted at septum; wall chestnut-brown above, cinnamon-brown below, 2.5–3.5 μ thick, slightly thickened above, 4–7 μ, smooth; pedicel concolorous with base of spore, firm, one fourth to one half length of spore.

ON CARDUACEAE:
Coleosanthus veronicaefolia (H.B.K.) Kuntze (*Brickellia veronicaefolia* A. Gray), Oaxaca, Pueblo.
TYPE LOCALITY: Oaxaca, Mexico, on *Brickellia veronicaefolia.*
DISTRIBUTION: Southern Mexico.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 3, f. 32.*

126. **Micropuccinia Spegazzinii** (De-Toni) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia australis Speg. Anal. Soc. Ci. Argent. 10: 8. 1880. Not *P. australis* Körn. 1876.
Puccinia Spegazzinii De-Toni, in Sacc. Syll. Fung. 7: 704. 1888.
Dicaeoma Spegazzinii Kuntze, Rev. Gen. 3³: 470. 1898.
Dasyspora australis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Melothriae Stevens, Bot. Gaz. 43: 283. 1907.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded in orbicular groups 1–5 mm. across, rarely confluent, round, small, 0.25 mm. or less in diameter, compact, soon naked, cinnamon-brown, ruptured epidermis inconspicuous; teliospores linear-oblong or clavate, 14–18 by 38–60 μ, obtuse or rounded above, narrowed below, slightly or not constricted at septum; wall pale-yellowish, thin, 1 μ, slightly thickened at apex, 2–3 μ, smooth; pedicel colorless, 8–10 μ thick, as long as spore or shorter, often somewhat expanded immediately below attachment to spore.

ON CARDUACEAE:
Mikania cordifolia (L. f.) Willd. (*Willugbaeya cordifolia* Kuntze), Florida; Guatemala.
Mikania scandens (L.) Willd. (*Willugbaeya scandens* Kuntze), Alabama, Florida, Mississippi, North Carolina, Texas; Costa Rica; Cuba; Panama; Porto Rico; Martinique.
TYPE LOCALITY: Boca del Riachuelo, Argentina, on *Mikania scandens periplocifolia.*
DISTRIBUTION: North Carolina to Texas southward through the West Indies and Central America; also in South America.
EXSICCATI: Seym. & Earle, Econ. Fungi Suppl. *B18.*

127. **Micropuccinia Virgaureae** (DC.) Arth. & Jackson; Arth. Bull. Torrey Club 48: 42. 1921.

Xyloma Virgaureae DC. Syn. Pl. 63. 1806.
Xyloma Solidaginis Fries, Obs. Myc. 1: 199. 1815.
Dothidea Solidaginis Virgaureae Fries, Syst. Myc. 2: 562. 1822.
Asteroma Virgaureae Libert, Pl. Crypt. *393.* 1837.
Puccinia minutula Peck, Ann. Rep. N. Y. State Mus. 24: 91. 1872.
Dicaeoma Virgaureae Kuntze, Rev. Gen. 3³: 471. 1898.
Dasyspora Virgaureae Arth. Résult Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, closely gregarious but not confluent, in irregular or orbicular groups 3–8 mm. across, on discolored spots, small, 0.2–0.3 mm. in diameter, punctiform, often

arranged in radiating or dendritic manner, grayish-black, long covered by the epidermis, surrounded by a thin stroma of small dark cells; teliospores somewhat irregularly oblong or obovate-oblong, 15–22 by 32–56 μ, obtuse, acute, or truncate above, obtuse or narrowed below, slightly or not constricted at septum; wall dark cinnamon-brown, 1.5–2 μ thick, thickened at apex, 4–9 μ, smooth; pedicel nearly colorless or concolorous with base of spore, firm, half length of spore, usually shorter; mesospores occasionally intermixed.

ON CARDUACEAE:
Solidago puberula Nutt., Massachusetts.
Solidago rugosa Mill., New Hampshire.
Solidago ulmifolia Muhl., Michigan, New York.
Solidago sp., Nova Scotia.
TYPE LOCALITY: France, on *Solidago Virgaurea*.
DISTRIBUTION: Nova Scotia to Michigan; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 264;* Corda, Ic. Fung. **4**: *pl. 4, f. 42;* Grove, Brit. Rust Fungi *f. 81;* Krypt.-fl. Brand Pilze **3**: *f. B177;* Fl. Ital. Crypt. Ured. *f. 57b.*
EXSICCATI: Barth. N. Am. Ured. *480;* Rel. Farl. *277a,b.*

128. **Micropuccinia Asteris** (Duby) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Asteris Duby, Bot. Gall. **2**: 888. 1830.
Puccinia Asteris Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Helenii Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Tripolii Wallr. Fl. Crypt. Germ. **2**: 223. 1833.
Puccinia Gerardii Peck, Ann. Rep. N. Y. State Mus. **24**: 91. 1872.
Puccinia Asteris purpurascens Cooke & Peck; Peck, Ann. Rep. N. Y. State Mus. **25**: 118. 1873.
Puccinia sclerotioidea Cooke, Grevillea **8**: 35. 1879.
Puccinia Doloris Speg. Anal. Soc. Ci. Argent. **12**: 68. 1881.
Puccinia magnoecia Ellis & Ev. Bull Torrey Club **22**: 59. 1895.
Dicaeoma Asteris Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Doloris Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Helenii Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora Asteris Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Leptopuccinia Asteris Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, variable, solitary, 0.4–2 mm. across, or more commonly gregarious, distinct, or confluent in groups 0.2–1 cm. across, on discolored spots at first yellowish, sometimes punctate, but usually small, round, 0.2–0.5 mm. in diameter, early naked, compact, often pulvinate, cinnamon- or blackish-brown, becoming cinereous by germination, ruptured epidermis usually conspicuous; teliospores oblong or clavate, 14–23 by 32–55μ, rounded, obtuse, or acute above, rounded or more commonly narrowed to pedicel below, usually slightly constricted at septum; wall golden- or cinnamon-brown, often darker above, 1.5–2.5 μ thick, greatly thickened above, 6–14 μ, smooth; pedicel nearly colorless, firm, equaling spore or commonly shorter; mesospores occasionally intermixed.

This species is correlated with *Nigredo perigynia* (Halsted) Arth. and *Dicaeoma Asterum* (Schw.) Arth. & Kern, the telial characters of the three species being strikingly similar and the hosts of the short-cycled species corresponding with the aecial hosts of the two heteroecious species. This agreement doubtless indicates a common origin for the three species.

ON CARDUACEAE:
Aster acuminatus Michx., New Hampshire, New York, Vermont; Nova Scotia.
Aster adscendens Lindl., Montana, Utah.
Aster azureus Lindl., Indiana, Nebraska.
Aster Burkei (A. Gray) Howell (*A. foliaceus Burkei* A. Gray), Washington.
Aster Canbyi Vasey, Montana, Wyoming.
Aster chilensis Nees (*A. Chamissonis* A. Gray), California.
Aster conspicuus Lindl., Montana, Oregon; Alberta, British Columbia.
Aster cordifolius L., Iowa, Maryland, Mississippi, New Hampshire, New Jersey, New York, Pennsylvania, West Virginia; Ontario.
Aster crassulus Rydb. (*A. hebecladus* Coult. & Nels. not DC.), Colorado, Montana, Wyoming.
Aster Drummondii Lindl., Arkansas.
Aster Eatonii (A. Gray) Howell, Utah.
Aster ericoides L., Kentucky, New York, Pennsylvania.
Aster Fremontii (T. & G.) A. Gray, Washington.
Aster Geyeri (A. Gray) Howell, Montana.
Aster kentuckiensis Britton, Alabama.
Aster laevis L., Colorado, Idaho, New York, Washington; Ontario.
Aster lateriflorus (L.) Britton (*A. diffusus* Ait., *A. miser* Nutt.), Indiana, Iowa, Tennessee, Virginia, West Virginia.
Aster Lowrieanus Porter, Pennsylvania.

Aster lucayanus Britton, Bahamas.
Aster macrophyllus L., Maine, Massachusetts, Michigan, Minnesota, New York, West Virginia, Wisconsin; Nova Scotia, Ontario.
Aster multiflorus Ait., Colorado, Kansas, Nebraska, South Dakota, Wyoming.
Aster nebraskensis Britton, Nebraska.
Aster Novae-Angliae L., Connecticut, Indiana, Iowa, New York, North Dakota; Manitoba.
Aster Novae-Belgii L., Maine, New York; Newfoundland.
Aster oblongifolius Nutt., Kansas, Nebraska.
Aster paniculatus Lam. (*A. paniculatus bellidiflorus* T. & G.), Delaware, Illinois, Indiana, Iowa, Kansas, Michigan, Nebraska, New York, North Dakota, South Dakota, Virginia, Wisconsin.
Aster pauciflorus Nutt., Mexico (state).
Aster prenanthoides Muhl., New York, Pennsylvania, Wisconsin.
Aster puniceus L. (*A. puniceus laeviculmis* A. Gray), Indiana, Iowa; Ontario.
Aster sagittifolius Willd., Pennsylvania.
Aster salicifolius Lam., Arkansas, Delaware, Indiana, Maine, Missouri, New York, Pennsylvania.
Aster Tradescanti L., Missouri.
Aster undulatus L., Massachusetts.
Aster vimineus Lam., New York.
Aster Wootonii Greene, New Mexico.
Aster yosemitanus (A. Gray) Greene (*A. adscendens yosemitanus* A. Gray), California.
Aster sp., North Carolina, Oklahoma, Oregon, Texas; Quebec.
Erigeron bonariensis L., Guatemala.
Erigeron Deamii B. L. Robinson, Guatemala.
Erigeron sp., Costa Rica.
Eucephalus glaucus Nutt. (*Aster glaucus* T. & G.), Wyoming.
Psilactis asteroides A. Gray, New Mexico.

TYPE LOCALITY: France, on *Aster salignus*.

DISTRIBUTION: Newfoundland to British Columbia southward to the Bahamas and Costa Rica; also in Europe.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 11a, b;* Grove, Brit. Rust Fungi *f. 80;* Krypt.-fl. Brand. Pilze **3**: *f. B122;* Ann. Rep. N. Y. State Mus. **25**: *pl. 2, f. 23, 23a, 24.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *11a, b;* Barth. Fungi Columb. *2348, 2557, 2653, 2755, 2959, 3249, 3544, 4139, 4256, 5051;* Barth. N. Am. Ured. *23, 124, 330, 331, 419, 531, 729, 730, 819, 926, 1133, 1221, 1332, 1472, 1528, 1744, 1832, 1932, 2033, 2137, 2138, 2228, 2229, 2340, 2426, 2537, 2626;* Brenckle, Fungi Dak. *60, 290;* Ellis, N. Am. Fungi *1035, 1045a, b, 1046;* Ellis & Ev. Fungi Columb. *50, 1073, 1385, 1758, 1952;* Garrett, Fungi Utah. *64, 128, 153;* D. Griff. W. Am. Fungi *259, 371, 371a;* Rel. Farl. *242;* Seym. & Earle, Econ. Fungi *478;* Sydow, Ured. *862, 1867, 2410,2512.*

129. **Micropuccinia Grindeliae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Grindeliae Peck, Bot. Gaz. **4**: 127. 1879.
Puccinia variolans Hark. Bull. Calif. Acad. Sci. **1**: 35. 1884.
Puccinia Solidaginis Peck, Bull. Torrey Club **11**: 49. 1884.
Puccinia Tanaceti Actinellae Webber, Bull. Neb. Exp. Sta. **1**: 55. 1889.
Puccinia Bigeloviae Ellis & Ev. N. Am. Fungi *2248*, hyponym. 1889.
Puccinia Gutierreziae Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 152. 1893.
Puccinia tuberculans Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 153. 1893.
Puccinia Lygodesmiae Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 154. 1893.
Puccinia hyalomitra Dietel & Holway; Dietel, Bot. Gaz. **19**: 304. 1894.
Puccinia Erigerontis Ellis & Ev. Bull. Torrey Club **24**: 282. 1897.
Puccinia irregularis Ellis & Tracy, Bull. Torrey Club **24**: 283. Jl 1897. Not *P. irregularis* Dietel, F 1897.
Dicaeoma Bigeloviae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Grindeliae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Gulierreziae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma hyalomitra Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Lygodesmiae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Solidaginis Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dicaeoma tuberculans Kuntze, Rev. Gen. **3**[3]: 471. 1898.
Dicaeoma variolans Kuntze, Rev. Gen. **3**[3]: 471. 1898.
Puccinia Tracyi Sacc. & Sydow, in Sacc. Syll. Fung. **14** : 304. 1899.
Puccinia cornigera Ellis & Ev. Bull. Torrey Club **27**: 462. 1900.
Puccinia Xylorrhizae Arth. Bull. Torrey Club **28**: 662. 1901.
Puccinia Actinellae Sydow, Monog. Ured. **1**: 4. 1902.
Puccinia Aplopappi Sydow, Monog. Ured. **1**: 8. 1902.
Puccinia confluens Sydow, Monog. Ured. **1**: 81. 1902.
Gymnoconia Riddellii D. Griff. Bull. Torrey Club **29**: 296. 1902.
Dasyspora Actinellae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Erigerontis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Grindeliae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Solidaginis Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Dasyspora tuberculans Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Dasyspora variolans Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Micropuccinia Actinellae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Micropuccinia Solidaginis Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.
Micropuccinia Lygodesmiae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Micropuccinia tuberculans Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Micropuccinia variolans Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Micropuccinia Xylorrhizae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Leptopuccinia Actinellae Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Grindeliae Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Lygodesmiae Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia tuberculans Sydow, Ann. Myc. **20**: 121. 1922.
Leptopuccinia variolans Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia rare, on certain hosts only, amphigenous, crowded in small groups or scattered among the telia, punctiform, yellowish, inconspicuous, globoid, 100–150 μ in diameter; ostiolar filaments 50–80 μ long, becoming agglutinate.

III. Telia amphigenous or caulicolous, solitary or more commonly gregarious and often more or less confluent in orbicular groups 0.2–1 cm. across, on discolored spots, variable in size, 0.2–1 mm. in diameter, round or elliptic, usually early naked, compact, at first punctate, often becoming pulvinate, dark chocolate-brown or blackish, ruptured epidermis usually conspicuous; teliospores ellipsoid, oblong, or obovate, occasionally irregular, 18–28 by 35–64 μ, rounded, obtuse or acute above, rounded or occasionally narrowed to pedicel below, usually noticeably constricted at septum; wall dark cinnamon- or chestnut-brown, 1.5–3 μ thick, usually greatly thickened above, concolorous or sometimes paler, 4–15 μ, smooth; pedicel colorless or golden-brown, firm, once to thrice length of spore; mesospores and spores with three or more cells occasionally intermixed.

On some hosts, especially when accompanied by pycnia, with a few detached peridial cells and aeciospores within the telia, best seen in young sori; peridial cells colorless, globoid, 24–36 by 26–48 μ, closely and coarsely tuberculate; aeciospores globoid, 16–26 by 20–32 μ; wall golden-brown, 1.5–3 μ thick, finely verrucose.

This species is correlated with *Dicaeoma Stipae* (Arth.) Kuntze, the telial characters of the two species being essentially the same and the hosts of the short-cycled species corresponding to the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Chrysoma laricifolia (A. Gray) Greene (*Aplopappus laricifolius* A. Gray), Arizona.
Chrysopsis Bakeri Greene, Colorado, Utah.
Chrysopsis Berlandieri Greene (*C. villosa canescens* A. Gray), Oklahoma.
Chrysopsis fastigiata Greene, California.
Chrysopsis imbricata A. Nelson, Colorado.
Chrysopsis resinolens A. Nelson, Colorado, Wyoming.
Chrysopsis villosa (Pursh) Nutt., Colorado.
Chrysopsis sp., Arizona.
Chrysothamnus Bigelovii (A. Gray) Greene (*Bigelovia Bigelovii* A. Gray), Colorado.
Chrysothamnus Bloomeri (A. Gray) Greene (*Aplopappus Bloomeri* A. Gray), California.
Chrysothamnus elegans Greene, Colorado.
Chrysothamnus frigidus Greene, Wyoming.
Chrysothamnus glaucus A. Nelson, Wyoming.
Chrysothamnus graveolens (Nutt.) Greene (*Bigelovia graveolens* A. Gray), Colorado.
Chrysothamnus lanceolatus Nutt. (*Bigelovia Douglasii lanceolata* A. Gray), Colorado.
Chrysothamnus linifolius Greene, Utah.
Chrysothamnus marianus Rydb., Utah.
Chrysothamnus nauseosus (Pursh) Britton (*Bigelovia graveolens albicaulis* A. Gray), Montana, Nevada.
Chrysothamnus plattensis Greene, Colorado, Montana.
Chrysothamnus puberulus (D. C. Eaton) Greene (*Bigelovia Douglasii puberula* A. Gray), Utah.
Chrysothamnus pulcherrimus A. Nelson, Utah.
Chrysothamnus pumilus Nutt. (*Bigelovia Douglasii pumila* A. Gray), Colorado, Utah.
Chrysothamnus viscidiflorus (Hook.) Nutt. (*Bigelovia Douglasii* A. Gray), Utah.
Erigeron arenarioides A. Gray (*Aster arenarioides* A. Gray), Utah.
Erigeron caespitosus Nutt., Wyoming.
Erigeron Eatonii A. Gray, Wyoming.
Erigeron filiformis (Hook.) Nutt., Nevada.
Erigeron macranthus Nutt., Colorado, Utah, Wyoming.
Erigeron microlonchus Greene, Wyoming.
Erigeron salsuginosus (Richards.) A. Gray, Utah.
Eucephalus glaucus Nutt. (*Aster glaucus* T. & G.), Colorado, Wyoming.
Grindelia aphanactis Rydb., Colorado, New Mexico.
Grindelia cuneifolia Nutt. (*G. robusta angustifolia* A. Gray), California.
Grindelia erecta A. Nelson, Colorado.
Grindelia fastigiata Greene, Colorado.
Grindelia inornata Greene, Colorado.

Grindelia perennis A. Nelson, Colorado.
Grindelia robusta Nutt., California.
Grindelia squarrosa (Pursh) Dunal, Colorado, Kansas, Montana, Nebraska, New Mexico, Texas, Wyoming; Saskatchewan.
Grindelia subalpina Greene, Colorado, New Mexico.
Grindelia texana Scheele, Colorado, Texas.
Grindelia sp., Durango.
Gutierrezia californica (DC.) T. & G., California; Lower California.
Gutierrezia diversifolia Greene, Arizona, Wyoming.
Gutierrezia filifolia Greene, Utah.
Gutierrezia glomerella Greene, New Mexico, Utah.
Gutierrezia juncea Greene, Arizona, New Mexico, Wyoming.
Gutierrezia longifolia Greene, Arizona.
Gutierrezia Sarothrae (Pursh) Britt. & Rusby (*G. Euthamiae* T. & G.), Colorado, Montana, Nevada, North Dakota, South Dakota, Utah, Wyoming.
Gutierrezia tenuis Greene, Arizona, New Mexico.
Gymnosperma corymbosum DC., Zacatecas.
Hazardia squarrosa (Hook. & Arn.) Greene (*Aplopappus squarrosus* Hook. & Arn.), California.
Hymenopappus carolinensis (Lam.) Porter, Oklahoma.
Isocoma heterophylla (A. Gray) Greene (*Linosyris heterophylla* A. Gray, *Bigelovia Wrightii* A. Gray), New Mexico.
Isocoma vernonioides Nutt. (*I. veneta* Greene, *Bigelovia veneta* A. Gray), Hidalgo.
Machaeranthera canescens (Pursh) A. Gray (*Aster canescens* A. Gray), Nevada.
Machaeranthera tanacetifolia (H.B.K.) Nees (*Aster tanacetifolius* H.B.K.), Colorado, Kansas.
Petradoria pumila (Nutt.) Greene (*Solidago pumila* T. & G., *Chrysoma pumila* Nutt.), Utah.
Prionopsis ciliata Nutt. (*Aplopappus ciliatus* DC.), Kansas.
Psilostrophe Cooperi (A. Gray) Greene (*Riddellia Cooperi* A. Gray), Arizona.
Psilostrophe tagetina (Nutt.) Greene (*Riddellia tagetina* T. & G.), Arizona.
Pyrrocoma Vaseyi (Parry) Rydb. (*Aplopappus lanceolatus Vaseyi* Parry), Colorado.
Sideranthus annuus Rydb. (*Aplopappus rubiginosus* A. Gray), Colorado.
Sideranthus australis (Greene) Rydb. (*Eriocarpum australe* Greene), Arizona, Colorado.
Sideranthus gracilis (Nutt.) Rydb. (*Aplopappus gracilis* A. Gray), Arizona.
Sideranthus grindelioides (Nutt.) Rydb. (*Aplopappus Nuttallii* T. & G.), Montana, Wyoming.
Sideranthus spinulosus (Pursh) Sweet (*Aplopappus spinulosus* DC.), Colorado, Kansas, Montana, Nebraska, New Mexico, Texas; Aguascalientes.
Solidago californica Nutt., California.
Solidago mollis Bartl., South Dakota.
Solidago nana Nutt., Colorado.
Solidago nemoralis Ait., Illinois, Iowa, Minnesota, Nebraska.
Solidago oreophila Rydb., Colorado, Wyoming.
Solidago pulcherrima A. Nelson, Colorado, Utah, Wyoming.
Solidago rigidiuscula (T. & G.) Porter, Nebraska.
Solidago trinervata Greene, New Mexico, Utah.
Stenotus latifolius A. Nelson, Utah.
Tetradymia canescens DC., Nevada, Utah.
Tetradymia glabrata A. Gray, California, Nevada.
Tetradymia Nuttallii T. & G., Utah.
Tetradymia spinosa Hook. & Arn., Nevada, Wyoming.
Tetraneuris acaulis (Pursh) Greene (*Actinella acaulis* Nutt.), Montana, Utah, Wyoming.
Tetraneuris argentea (A. Gray) Greene (*Actinella argentea* A. Gray), New Mexico.
Tetraneuris arizonica Greene (*T. pilosa* Greene), Colorado.
Tetraneuris fastigiata Greene (*T. stenophylla* Rydb., *Actinella fastigiata* A. Nelson), Kansas.
Tetraneuris leptoclada (A. Gray) Greene (*Actinella leptoclada* A. Gray), Colorado, Utah.
Tetraneuris simplex A. Nelson (*Actinella simplex* A. Nelson), North Dakota.
Tetraneuris Torreyana (Nutt.) Greene (*Actinella Torreyana* Nutt.), Colorado, Wyoming.
Xylorrhiza glabriuscula Nutt. (*Aster glabriusculus* A. Gray), Wyoming.
Xylorrhiza Parryi (A. Gray) Greene (*Aster Parryi* A. Gray), Wyoming.

ON CICHORIACEAE:
Lygodesmia juncea (Pursh) D. Don, Colorado, Kansas, Nebraska, North Dakota, South Dakota; Manitoba.

TYPE LOCALITY: Colorado, on *Grindelia squarrosa*.

DISTRIBUTION: Manitoba to northern California southward to Texas, central Mexico, and Lower California.

ILLUSTRATIONS: Bot. Gaz. **28**: 420, *f. 3;* Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 3, f. 16;* Sydow, Monog. Ured. **1**: *pl. 1, f. 3, 7; pl. 3, f. 41, 42; pl. 5, f. 67, 68; pl. 8, f. 129; pl. 9, f. 130, 143.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *16;* Barth. Fungi Columb. *2263, 2270, 2356, 2776, 3359, 3741, 3754, 3755, 3756, 4146, 4154, 4358;* Barth. N. Am. Ured. *144, 343, 351, 414, 445, 446, 552, 742, 841, 843, 867, 943, 969, 1046, 1077, 1243, 1671, 1829, 1845, 1875, 1972, 2028, 2059, 2271, 2438;* Brenckle, Fungi Dak. *491;* Carleton, Ured. Am. *25, 50;* Clements, Crypt. Form. Colo. *319, 320, 554, 559, 564, 569;* Ellis, N. Am. Fungi *1445;* Ellis & Ev. Fungi Columb. *179, 265, 754, 1375, 1666, 1975, 2072;* Ellis & Ev. N. Am. Fungi *2236, 2237, 2248, 3479;* Garrett, Fungi Utah. *18, 41, 43, 47, 89, 141, 143, 210, 213, 215;* D. Griff. W. Am. Fungi *61, 61a, 239, 240, 262, 364, 378, 378a, b;* Seym. & Earle, Econ. Fungi Suppl. *B11;* Sydow, Ured. *1020, 1707, 1770, 1820, 1913, 1920, 1941, 1942;* Vesterg. Mic. Rar. Sel. *1579.*

130. **Micropuccinia Marianae** (Sydow) Arthur & Jackson.

Puccinia Marianae Sydow, Hedwigia Beibl. **40**: 127. 1901.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, gregarious and often confluent in orbicular groups 2–10 mm. across, small, round, 0.2–0.5 mm. in diameter, early naked, compact, pulvinate, blackish-brown, ruptured epidermis inconspicuous; teliospores variable, cylindric, fusiform, ellipsoid, or clavate, 18–28 by 40–64 μ, rounded or more commonly tapering and obtuse above, rounded or narrowed below; slightly or not constricted at septum; wall dark cinnamon- or chestnut-brown, thick, 2–3.5 μ, slightly thicker above, 4–8 μ, smooth; pedicel colorless, twice length of spore; mesospores frequently intermixed.

ON CARDUACEAE:
Sideranthus megacephalus (Nash) Small, Florida.
TYPE LOCALITY: Sanibel Island, Florida, on "*Chrysopsis Mariana*," now determined as *Sideranthus megacephalus*.
DISTRIBUTION: Southern Florida.

131. **Micropuccinia Notopterae** (Arth.) Arthur & Jackson.

Puccinia Notopterae Arth. Bull. Torrey Club **45**: 149. 1918.

O. Pycnia amphigenous, crowded on brownish areas 2–3 mm. across, conspicuous, dark-brown, globoid, 85–150 by 90–130 μ; ostiolar filaments up to 80 μ long.

III. Telia epiphyllous, becoming amphigenous, arranged in a concentric manner about the pyenia or on the veins becoming confluent, circular or oblong, 0.3–1 mm. across, early naked, pulverulent, dark cinnamon- to light chestnut-brown, ruptured epidermis noticeable; teliospores ellipsoid, 19–24 by 26–34 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, about 1.5 μ thick, uniform, coarsely and rather sparingly verrucose; pedicel colorless, fragile.

ON CARDUACEAE:
Notoptera hirsuta (Sw.) Urban, Jamaica.
TYPE LOCALITY: Mandeville, Jamaica, on *Notoptera hirsuta*.
DISTRIBUTION: Known only from the type locality.

132. **Micropuccinia ferox** (Dietel & Holway) Arthur & Jackson.

Puccinia ferox Dietel & Holway; Holway, Bot. Gaz. **31**: 333. 1901.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, closely crowded over large areas, causing considerable distortion, round, small, 0.2–0.5 mm. across, early naked, very pulverulent, cinnamon-brown, ruptured epidermis not conspicuous; teliospores ellipsoid, 22–26 by 35–48 μ, rounded above and below, noticeably constricted at septum; wall light cinnamon-brown, uniformly 1–2 μ thick, very finely and evenly verrucose-rugose, appearing smooth when wet; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Verbesina diversifolia DC., Oaxaca.
Verbesina myriocephala Schultz-Bip., Costa Rica.
TYPE LOCALITY: Oaxaca, Mexico, on *Verbesina diversifolia*.
DISTRIBUTION: Southern Mexico to Costa Rica.
EXSICCATI: Barth. Fungi Columb. *4569*; Barth. N. Am. Ured. *141*.

133. **Micropuccinia absicca** (Jackson & Holway) Arthur & Jackson.

Puccinia absicca Jackson & Holway; Arthur, Mycologia **10**: 144. 1918.

O. Pycnia epiphyllous, few, gregarious in compact groups 0.5 mm. across, conspicuous, yellowish or light-orange, globoid or depressed-globoid, 30–50 μ broad by 30–40 μ high; ostiolar filaments short.

III. Telia epiphyllous or rarely hypophyllous, numerous in crowded orbicular groups surrounding the pycnia 1–3 mm. across, or more elongate to 10 mm. along the veins, small, roundish, 0.5–0.8 mm. across, somewhat tardily naked, pulverulent, chestnut-brown, ruptured

epidermis conspicuous; teliospores ellipsoid, 20–24 by 28–34 μ, rounded at both ends, slightly or not constricted at septum; wall cinnamon- to chestnut-brown, 2–2.5 μ thick, thickened to 5–7 μ at apex and over pore of lower cell by a hyaline umbo, moderately verrucose-rugose, often with tendency to form reticulations or to arrangement in longitudinal lines, the pore of lower cell near pedicel; pedicel short, colorless, usually deciduous, often attached laterally.

This species is correlated with *Bullaria proba* (Jackson & Holway) Arth. & Mains, being morphologically similar in telial characters, and with similar hosts. The agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Zexmenia frutescens villosa (Polak.) Blake, Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Zexmenia frutescens villosa*.
DISTRIBUTION: Known only from the type locality.

134. **Micropuccinia Rudbeckiae** (Barth.) Arthur & Jackson.

Puccinia Rudbeckiae Barth. MS.

O. Pycnia not seen, probably not formed.

III. Telia amphigenous, closely gregarious and more or less confluent on discolored spots 0.3–1 cm. across, small, round or irregular, 0.2–0.5 mm. across, somewhat tardily naked, pulvinate, ruptured epidermis conspicuous; teliospores oblong or cylindric, 12–18 by 45–70 μ, rounded or obtuse above, the apex often bent to one side, somewhat narrowed or truncate below, not or slightly constricted at septum; wall light cinnamon-brown, thin, 1–1.5 μ, slightly thicker above, 3–4 μ, smooth; pedicel firm: colorless, one half length of spore or less.

ON CARDUACEAE:
Rudbeckia maxima Nutt., Texas.
TYPE LOCALITY: Longview, Texas, on *Rudbeckia maxima*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth, N. Am. Ured. ——.

135. **Micropuccinia ordinata** (Jackson & Holway) Arthur & Jackson.

Puccinia ordinata Jackson & Holway; Arth. Am. Jour. Bot. **5**: 530. 1918.

O. Pycnia not seen, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, crowded and confluent opposite yellowish sunken spots which become brownish with age, round, 1–2.5 mm. across, early naked, pulvinate, blackish becoming cinereous from germination, ruptured epidermis noticeable; teliospores oblong cylindric, 16–19 by 45–70 μ, rounded or obtuse at apex, narrowed below, slightly constricted at septum; wall cinnamon-brown, 1–2 μ, darker and thickened above, 6–12 μ, smooth; pedicel short, deciduous, colored like the spore.

ON CARDUACEAE:
Calea insignis Blake, Guatemala.
Calea integrifolia (DC.) Hemsl., Guatemala.
TYPE LOCALITY: Quezaltenango, Guatemala, on *Calea insignis*.
DISTRIBUTION: Guatemala.

136. **Micropuccinia semota** (Jackson & Holway) Arthur & Jackson.

Puccinia semota Jackson & Holway; Arth. Am. Jour. Bot. **5**: 531. 1918.
Leptopuccinia semota Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded in small groups 1–2 mm. across, round, 0.3–0.5 mm. in diameter, early naked, compact, pulvinate, dark chestnut-brown, ruptured epidermis inconspicuous; teliospores clavate, 13–18 by 48–58 μ, rounded at apex, slightly narrowed below, slightly constricted at septum; wall golden-brown, thin, 1 μ, thickened at apex to 10 μ, smooth; pedicel colorless, up to 16 μ long.

ON CARDUACEAE:
Gymnolomia subflexuosa Benth., Guatemala.
TYPE LOCALITY: Solola, Guatemala, on *Gymnolomia subflexuosa*.
DISTRIBUTION: Known only from the type locality.

137. **Micropuccinia Silphii** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Silphii Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Dicaeoma Silphii Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Silphii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia Silphii Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, solitary or gregarious and more or less confluent in orbicular groups 1–10 mm. across, on discolored spots, small, round, 0.5–1 mm. across, early naked, pulvinate, compact, at first cinnamon-brown becoming chocolate-brown, often cinereous by germination, ruptured epidermis usually inconspicuous; teliospores oblong, 10–16 by 30–48 μ, obtuse or acute at apex, often irregularly so, obtuse or truncate at base, slightly or not constricted at septum; wall cinnamon- or chestnut-brown, smooth, thin, 1–1.5 μ, thickened at apex, 4–10 μ; pedicel colorless or tinted, firm, once length of spore or shorter.

ON CARDUACEAE:
Silphium Asteriscus L., Alabama.
Silphium compositum Michx., Alabama.
Silphium integrifolium Michx., Illinois, Indiana, Kansas, Mississippi, Nebraska, Wisconsin.
Silphium laciniatum L., Alabama, Iowa, Kansas.
Silphium perfoliatum L., Indiana, Iowa, Mississippi, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.
Silphium trifoliatum L., North Carolina, West Virginia.
TYPE LOCALITY: North Carolina, on *Silphium trifoliatum*.
DISTRIBUTION: West Virginia and northern Alabama westward to North Dakota and Kansas.
ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 4a, b, c.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *4a, b, c;* Barth. Fungi Columb. *2365, 3266, 3371, 4866 5071;* Barth. N. Am. Ured. *262, 866, 1471;* Brenckle, Fungi Dak. *262;* Carleton, Ured. Am. *41;* Ellis, N. Am. Fungi *1033, 1462;* Ellis & Ev. Fungi Columb. *1659;* Kellerm. & Swingle, Kans. Fungi *45;* Sydow, Ured. *482, 1278.*

138. **Micropuccinia Melampodii** (Dietel & Holway) Arthur & Jackson.

Puccinia solida Berk. & Curt. Jour. Linn. Soc. **10**: 356. 1869. Not *P. solida* Schw. 1832.
Puccinia Synedrellae Lagerh.; Sydow, Ured. *376*, hyponym. 1890.
Puccinia Melampodii Dietel & Holway; Holway, Bot. Gaz. **24**: 32. 1897.
Puccinia Synedrellae P. Henn. Hedwigia **37**: 277. 1898.
Dicaeoma cubense Kuntze, Rev. Gen. **3**[3]: 466. 1898.
Dicaeoma Synedrellae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia Zinniae Sydow, Monog. Ured. **1**: 188. 1902.
Puccinia Diaziana Arth. Bot. Gaz. **40**: 203. 1905.
Puccinia Tridacis Arth. Bull. Torrey Club **33**: 516. 1906.
Dasyspora Synedrellae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Puccinia Eleutherantherae Dietel, Ann. Myc. **7**: 354. 1909.
Puccinia Tetranthi Sydow, Ann. Myc. **17**: 33. 1919.
Micropuccinia Synedrellae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.
Leptopuccinia Melampodii Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Synedrellae Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous or occasionally amphigenous, gregarious, distinct or more commonly confluent, on discolored spots 0.2–1.5 cm. across, small, round, 0.2–0.5 mm. in diameter, usually early naked, chestnut-brown becoming cinereous by germination, compact, usually pulvinate, ruptured epidermis usually inconspicuous; teliospores oblong or clavate, 14–22 by 34–50 μ, rounded or obtuse above, obtuse or more commonly narrowed to pedicel below, slightly or not constricted at septum; wall golden- or cinnamon-brown, 1–2.5 μ thick, thickened above, 4–10 μ, smooth; pedicel firm, colorless or tinted like base of spore, equaling the spore or shorter.

ON CARDUACEAE:
Eleutheranthera ruderalis (Sw.) Schultz-Bip., Panama; Cuba; Grenada; Guadeloupe; Jamaica; Porto Rico; Santo Domingo.
Melampodium divaricatum (Rich.) DC., Morelos; Guatemala.
Parthenium Hysterophorus L., Texas.
Spilanthes oleracea Jacq., Martinique.
Synedrella nodiflora (L.) Gaertn. (*Verbesina nodiflora* L.), Panama; Barbados; Cuba; Jamaica; Porto Rico; Santo Domingo; Tortola.
Tetranthus hirsutus Spreng. (*T. littoralis* Sw.), Haïti.
Tridax procumbens L., Cuba.

Ximenesia encelioides (Benth. & Hook.) Cav. (*Verbesina encelioides* Benth. & Hook.), Coahuila.
Zinnia tenuiflora Jacq., Jalisco.
TYPE LOCALITY: Cuernavaca, Mexico, on *Melampodium* [*divaricatum*].
DISTRIBUTION: Central Texas to Panama and through the West Indies; also in South America.
ILLUSTRATIONS: Sydow, Mong. Ured. **1**: *pl. 7, f. 101; pl. 9, f. 139.*
EXSICCATI: Sydow, Ured. *376, 1534.*

139. **Micropuccinia Flaveriae** (H. S. Jackson) Arthur & Jackson.

Puccinia Flaveriae H. S. Jackson, Mycologia **14**: 117. 1922.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous or caulicolous, gregarious on discolored spots, or extending for considerable distances on stems, round, small, 0.2–0.5 mm. in diameter, tardily naked, chestnut-brown, pulvinate, the caulicolous sori long covered by the cinereous epidermis, ruptured epidermis of foliicolous sori conspicuous; teliospores irregularly ellipsoid, clavate, or cylindric, 15–19 by 32–50 μ, often bent to one side, rounded, obtuse or more or less acute above, rounded or narrowed below, not constricted at septum; wall light cinnamon-brown, 1.5–2 μ thick, much thicker above, 5–10 μ, smooth; pedicel one half length of spore or shorter, firm, concolorous with base of spore.

ON CARDUACEAE:
Flaveria campestris J. R. Johnston (*F. angustifolia* A. Gray), Kansas.
TYPE LOCALITY: Manhattan, Kansas, on *Flaveria angustifolia*.
DISTRIBUTION: Known only from the type locality.

140. **Micropuccinia Millefolii** (Fuckel) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Millefolii Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 55. 1870.
Puccinia conferta Dietel & Holway; Dietel, Erythea **1**: 250. 1893.
Puccinia recondita Dietel & Holway; Dietel, Erythea **2**: 128. 1894. Not *P. recondita* Roberge, 1857.
Puccinia artemisiicola Sydow, Monog. Ured. **1**: 14. 1902.
Dasyspora conferta Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Millefolii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Micropuccinia conferta Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.
Leptopuccinia artemisiicola Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Millefolii Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, usually hypophyllous on broad leaves, solitary or gregarious, often crowded in irregular groups on yellowish spots, round or oval, 0.2–0.8 mm. across, early naked, compact, pulvinate, dark cinnamon- or chestnut-brown becoming cinereous by germination, ruptured epidermis usually inconspicuous; teliospores oblong or clavate, 16–23 by 35–58 μ, rounded, truncate, or obtuse above, rounded or, more commonly narrowed below, slightly or not constricted at septum; wall light cinnamon-brown, 1.5–3 μ thick, darker and thickened above, 7–12 μ, smooth; pedicel firm, colorless, one half to once length of spore; mesospores occasionally intermixed.

This species is correlated with *Dicaeoma Dracunculi* (Thüm.) Arth. & Kern, the telial characters of the two species being very similar, and the hosts of the short-cycled species corresponding with the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Achillea lanulosa Nutt., New Mexico.
Achillea Millefolium L., California, Montana, Oregon.
Artemisia albula Wooton, New Mexico.
Artemisia californica Less., California.
Artemisia frigida Willd., Colorado, Montana, North Dakota, South Dakota.
Artemisia gnaphalodes Nutt., Colorado, Montana.
Artemisia heterophylla Nutt., California.
Artemisia Hookeriana Besser, Utah.
Artemisia ludoviciana Nutt., Colorado, Oklahoma, Oregon.
Artemisia mexicana Willd., Texas.
Artemisia Suksdorfii Piper, Washington.
TYPE LOCALITY: Austria, on *Achillea Millefolium*.
DISTRIBUTION: North Dakota to northern Texas and westward to Washington and northern California; also in Europe.

ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 216;* Fl. Ital. Crypt. Ured. *f. 52a;* Grove, Brit. Rust Fungi *f. 82;* Sydow, Monog. Ured. **1**: *pl. 1, f. 9, 11.*
EXSICCATI: Barth. Fungi Columb. *2444, 3169;* Barth. N. Am. Ured. *1036, 1145, 1233, 1434, 1837, 2629;* Brenckle, Fungi Dak. *318;* Clements, Crypt. Form. Colo. *555;* Garrett, Fungi Utah. *183;* D. Griff. W. Am. Fungi *354a.*

141. **Micropuccinia conglomerata** (Strauss) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1912.

Uredo conglomerata Strauss, Ann. Wett. Ges. **2**: 100. 1810.
Puccinia conglomerata Schmidt & Kunze, Deuts. Schwämme **8**: 4. *191.* 1818.
Puccinia Nardosmiae Ellis & Ev. Jour. Myc. **1**: 85. 1885.
Dicaeoma conglomeratum Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Nardosmiae Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora conglomerata Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Petasites Vesterg. Micr. Rar. Sel. *1389.* 1909.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, rarely epiphyllous, gregarious but distinct in circular or irregular groups 0.5–1 cm. across, often arranged concentrically, small, round, 0.2–0.5 mm. in diameter, early naked, at first punctate, becoming pulverulent, chestnut-brown, ruptured epidermis noticeable; teliospores ellipsoid or oblong, 14–18 by 20–35 μ, obtuse or narrowed at either end, not constricted at septum; wall cinnamon-brown, thin, 1 μ, with small, hyaline, hemispheric umbo over pore at apex, 2–4 μ high, smooth; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Petasites frigida (L.) Fries, Alberta, British Columbia.
Petasites palmata (Ait.) A. Gray, Michigan, Minnesota, New York; Ontario.
TYPE LOCALITY: Mountains of Bavaria, Germany, on *Tussilago alpina.*
DISTRIBUTION: Northern New York to the mountains of British Columbia; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 140;* Corda, Ic. Fung. **4**: *pl. 4, f. 47;* Hedwigia **30**: *pl. 36, f. 1;* Krypt.-fl. Brand. Pilze **3**: *f. B124.*
EXSICCATI: Barth. N. Am. Ured. *1564, 2627;* Sydow, Ured. *2424.*

142. **Micropuccinia expansa** (Link) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia expansa Link, in Willd. Sp. Pl. 6^2: 75. 1825.
Dicaeoma expansum Kuntze, Rev. Gen. 3^3: 468. 1898.
Dasyspora expansa Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous or occasionally epiphyllous, gregarious and more or less confluent in more or less circular groups 3–10 mm. across, on yellowish spots, small, round, 0.2–0.4 mm. in diameter, early naked, at first punctate becoming pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores broadly ellipsoid, 18–26 by 30–38 μ, rounded or obtuse above, rounded below, not or very slightly constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, covered with a hemispheric hyaline papilla at apex and over pore of lower cell at septum, 3–4 μ high, smooth; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Senecio aronicoides DC., California.
Senecio dispar A. Nelson, Utah.
TYPE LOCALITY: Austria, on *Cacalia alpina* [*Adenostyles alpina*].
DISTRIBUTION: Mountains of Utah and northeastern California; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 141–144;* Hedwigia **30**: *pl. 26, f. 3.*
EXSICCATI: Garrett, Fungi Utah. 102.

143. **Micropuccinia Schistocarphae** (Jackson & Holway) Arthur & Jackson.

Puccinia Schistocarphae Jackson & Holway; Arth. Am. Jour. Bot. **5**: 534. 1918.
Leptopuccinia Schistocarphae Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown.

III. Telia hypophyllous, confluent over areas 0.5–2 mm. across, early naked, compact, pulverulent, very light yellowish-brown becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong or clavate, 16–22 by 39–55 μ, rounded at apex, slightly

narrowed below, slightly constricted at septum; wall colorless to very light golden-yellow, 1–1.5 μ thick, thickened to 5–9 μ at apex, smooth; pedicel colorless, less than length of spore.

ON CARDUACEAE:
Schistocarpha platyphylla Greenman, Guatemala.
TYPE LOCALITY: San Rafael, Dept. Guatemala, Guatemala, on *Schistocarpha platyphylla*.
DISTRIBUTION: Guatemala.

144. **Micropuccinia Emiliae** (P. Henn.) Arthur & Jackson.

Puccinia Emiliae P. Henn. Hedwigia **37**: 278. 1898.
Dasyspora Emiliae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, occasionally amphigenous, crowded and somewhat confluent in orbicular groups 1–5 mm. across, on discolored spots, small, round, 0.2–0.5 mm. in diameter early naked, compact, chestnut-brown, becoming cinereous by germination, ruptured epidermis usually noticeable; teliospores oblong-clavate, 14–20 by 35–55 μ, rounded or obtuse above, obtuse or narrowed below, slightly or not constricted at septum; wall cinnamon- or chestnut-brown, paler below, thin, 1–2 μ, thickened at apex, 4–10 μ, smooth; pedicel colorless, or more commonly tinted, half length of spore or shorter.

ON CARDUACEAE:
Calendula officinalis L. (cult.), Illinois, Indiana, Nebraska; Cuba.
Dimorphotheca cuneata (Thunb.) DC. (cult.), Indiana, Nebraska.
Emilia sagittata (Vahl) DC., Jamaica.
Emilia sonchifolia (L) DC., Florida; Antigua; Barbados; Cuba; Grenada; Jamaica; Martinique; Porto Rico.
Neurolaena lobata (L.) R. Br., Costa Rica; Panama; Cuba; Porto Rico.
TYPE LOCALITY: Jamaica, on *Emilia sagittata*.
DISTRIBUTION: Southern Florida southward through the West Indies, and in cultivation from Nebraska to Indiana.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 4, f. 64.*
EXSICCATI: Barth. N. Am. Ured. *1863.*

145. **Micropuccinia recedens** (Sydow) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia recedens Sydow, Monog. Ured. 1: 146. 1902.
Dasyspora recedens Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, less commonly epiphyllous, densely gregarious and often more or less confluent in groups 4–8 mm. across, on discolored spots, small, round, 0.2–0.5 mm. in diameter, early naked, compact, pulvinate, cinnamon- or chestnut-brown, becoming cinereous by germination, ruptured epidermis at first noticeable; teliospores oblong or clavate, 14–22 by 32–48 μ, rounded or obtuse above, narrowed below, usually noticeably constricted at septum; wall light cinnamon-brown, 1.5–2.5 μ thick, broadly thickened above, 6–10 μ, smooth; pedicel delicate, colorless or slightly tinted, one half length of spore; mesospores occasionally intermixed.

This species is correlated with *Dicaeoma Eriophori* (Thüm.) Kuntze, the telial characters being essentially the same, and the hosts of the short-cycled form corresponding to aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Senecio aureus L., Delaware, Michigan, New Jersey, New York, Pennsylvania, West Virginia, Wisconsin.
Senecio Balsamitae Muhl., Alberta.
Senecio crocatus Rydb., Wyoming.
Senecio Harfordii Greenm., Oregon.
Senecio pseudaureus Rydb., Idaho, Montana.
TYPE LOCALITY: Ann Arbor, Michigan, on *Senecio* [*aureus*].
DISTRIBUTION: West Virginia and southern New York to the mountains of Oregon and Alberta.
ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 11c;* Sydow, Monog. Ured. 1: *pl. 8, f. 124.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *11c;* Barth. N. Am. Ured. *1568, 2632.*

146. **Micropuccinia Suksdorfii** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Suksdorfii Ellis & Ev. Jour. Myc. **7**: 130. 1892.
Caeomurus Suksdorfii Kuntze, Rev. Gen. **3**^{3}: 470. 1898.
Dasyspora Suksdorfii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia amphigenous, widely scattered, conspicuous, chestnut-brown becoming white, flattened-globoid, 112–122 μ wide by 70–112 μ high; ostiolar filaments 80–144 μ long, slightly projecting beyond the ostiole.

III. Telia amphigenous, scattered over large areas, round or oblong, 0.2–2 mm. across, at first covered, soon becoming naked, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong-ellipsoid, 27–39 by 35–55 μ, rounded above and below, slightly constricted at septum; wall chestnut-brown, uniform in thickness, 2–3 μ, moderately conic-verrucose; pedicel colorless, fragile.

ON CICHORIACEAE:
Agoseris aurantiaca (Hook.) Greene (*Troximon aurantiacum* Hook.), Colorado.
Agoseris elata (Nutt.) Greene, Utah.
Agoseris glauca (Nutt.) Greene (*Troximon glaucum* Nutt.), Arizona, Idaho, Montana, Washington.
Agoseris grandiflora (Nutt.) Greene (*Troximon grandiflorum* A. Gray), Montana.
Agoseris leptocarpa Osterhout, Arizona.
Agoseris sp., Wyoming.
Nothocalais cuspidata (Pursh) Greene (*Troximon cuspidatum* Pursh), Montana.
TYPE LOCALITY: Washington, on *Troximon glaucum*.
DISTRIBUTION: Mountains of Colorado and Arizona northward to Montana and western Washington.
EXSICCATI: Barth. N. Am. Ured. *1969;* Garrett, Fungi Utah. *170*.

147. **Micropuccinia Fraseri** (Arth.) Arthur & Jackson.

Puccinia Fraseri Arth. Bull. Torrey Club **42**: 591. 1915.

O. Pycnia unknown.

III. Telia mostly hypophyllous, scattered, usually covering all the leaf, round, 0.2–0.5 mm. in diameter, early naked, strongly pulvinate, pale yellowish-brown, becoming whitish from germination, ruptured epidermis inconspicuous; teliospores oblong or ellipsoid, 13–20 by 30–42 μ, rounded at both ends, slightly or not constricted at septum; wall pale-yellow or colorless, rather thin, 1–1.5 μ, thickened at apex, 3–9 μ, smooth; pedicel colorless, 6–10 μ broad, about length of spore or less; urediniospores occasionally occurring among teliospores, ellipsoid or obovoid, 15–20 by 23–29 μ, the wall pale-yellow or colorless, 2–2.5 μ thick, moderately echinulate, the pores obscure, probably 3 or 4, equatorial.

ON CICHORIACEAE:
Hieracium albiflorum Hook., Montana.
Hieracium scabrum Michx., Nova Scotia, Quebec.
Hieracium venosum L., Pennsylvania.
TYPE LOCALITY: Pictou, Nova Scotia, on *Hieracium scabrum*.
DISTRIBUTION: Central Pennsylvania to eastern Canada, and in northern Montana.

148. **Micropuccinia columbiensis** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia columbiensis Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 153. 1893.
Dicaeoma columbiense Kuntze, Rev. Gen. **3**^{3}: 468. 1898.
Puccinia bicolor Ellis & Ev. Bull. Torrey Club **27**: 572. 1900.
Dasyspora bicolor Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Nabali Arth. Bull. Torrey Club **37**: 571. 1910.
Leptopuccinia columbiensis Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, crowded and circinating in groups 2–10 mm. in diameter, round or oblong, 0.3–1.5 mm. across, early naked, pulvinate, blackish-brown, ruptured epidermis conspicuous; teliospores clavate, oblong, or ellipsoid, 15–24 by 32–55 μ, rounded or truncate above, narrowed or rounded below, slightly constricted at septum; wall chestnut-brown above, lighter below becoming yellowish in lower cell, 1–2 μ thick, considerably thickened at apex, 7–15 μ, smooth; pedicel slightly tinted, about length of spore or shorter.

ON CICHORIACEAE:
Agoseris glauca (Nutt.) Greene (*Troximon glaucum* Nutt.), Washington, Wyoming; Alberta.
Hieracium cinereum Howell, Oregon.
Hieracium Scouleri Hook., Oregon, Washington.
Nabalus racemosus (Michx.) DC., Quebec.
TYPE LOCALITY: Banff, Canada, on "*Oenothera biennis*," error for *Troximon glaucum*.
DISTRIBUTION: Wyoming and Oregon northward into Canada, and one locality in eastern Quebec.
EXSICCATI: Barth. N. Am. Ured. *1433;* Ellis & Ev. Fungi Columb. *1570*.

149. **Micropuccinia maculosa** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia maculosa Schw. Trans. Am. Phil. Soc. II. **4**: 295. 1832.
Leptopuccinia maculosa Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia mostly hypophyllous, circinating in groups 2–8 mm. across, crowded, often confluent, round, 0.2–0.5 mm. in diameter, early naked, pulvinate, cinnamon-brown becoming cinereous from germination; teliospores oblong or clavate, 15–19 by 31–45 μ, rounded above, rounded or narrowed below, not or slightly constricted at septum; wall golden-brown, thin, 1–1.5 μ, thickened above, 4–12 μ, smooth; pedicel colorless or slightly tinted, up to 19 μ long.

This species is correlated with *Dicaeoma hieraciatum* (Schw.) Arth. & Kern, the telial characters of the two species being essentially the same, and the host of the short-cycled species being the same as one of the aecial hosts of the heteroecious species.

ON CICHORIACEAE:
Adopogon virginicus (L.) Kuntze (*Cynthia virginica* D. Don, *Krigia amplexicaulis* Nutt.), Illinois, Michigan, Missouri, Pennsylvania.
TYPE LOCALITY: Bethlehem, Pennsylvania, on "*Prenanthes* or *Hieracium*," error for *Adopogon virginicus*.
DISTRIBUTION: Local in the northern United States east of the Rocky Mountains.
EXSICCATI: Ellis & Ev. N. Am. Fungi *1855;* Rab.-Wint. Fungi Eur. *3413*.

DOUBTFUL SPECIES

PUCCINIA SEPULTA Berk. & Curt. Proc. Am. Acad. **4**: 126. 1860. "On leaves of *Ficus?*" [Island of Omotepe] Nicaragua [March 18, 1856], *C. Wright.* The host bears a general resemblance but doubtless does not belong to the *Malvaceae;* the rust somewhat resembles *Micropuccinia heterospora* (Berk. & Curt.) Arth. & Jackson.

PUCCINIA SUFFULTA Berk. & Curt. Grevillea **3**: 55. 1874. "On leaves of some undetermined plant," Catoosa Springs, Georgia, *Ravenel.* The host of this collection has not yet been identified. The type specimen in the Kew herbarium shows the rust to be a species of *Micropuccinia* similar to *M. maculosa* (Schw.) Arth. & Jackson.

FORM-GENERA

Species whose life-cycle is not known, or is not readily assumed from related forms, and which can not be placed with confidence in the preceding genera, are here grouped under generic names that have long been in use, and have come to stand for certain definite characteristics. These genera do not represent the whole cycle of development, and are not based upon type species.

Telia present, sometimes accompanied by uredinia, but without pycnia or other spore-forms; teliospores free, pedicelled, with more or less of the pedicel remaining attached to the spore, smooth or verrucose.
  Teliospores one-celled. 1. UROMYCES.
  Teliospores two-celled. 2. PUCCINIA.
Uredinia present, occasionally accompanied by pycnia or aecia, but without telia; urediniospores 1-celled, readily falling from the pedicel exposing the hilum, echinulate, or in a few species verrucose. 3. UREDO.
Aecia present, sometimes accompanied by pycnia, but without other spore-forms; aeciospores 1-celled, catenulate.
  Aecia having peridia.
    Peridia cupulate or less often cylindric, on angiospermous hosts. 4. AECIDIUM.
    Peridia cylindric or bullate, on gymnospermous hosts. 5. PERIDERMIUM.
  Aecia having no peridia. 6. CAEOMA.

1. UROMYCES.

Telia subepidermal, definite, erumpent or long covered by the epidermis, usually without paraphyses. Teliospores free, pedicellate, one-celled; wall usually colored, firm, smooth or verrucose, the pore one and apical, or nearly so.

Uredinia when present subepidermal, erumpent. Urediniospores echinulate, the pores more than one, and variously placed.

Genus based upon a concept, and not upon a type species.

Host belonging to family Caesalpiniaceae.	
Urediniospore-pores 3, equatorial.	1. *U. imperfectus.*
Urediniospore-pores 3–5, variable.	2. *U. guatemalensis.*
Host belonging to family Krameriaceae.	3. *U. Krameriae.*
Host belonging to family Fabaceae.	
Teliospores globoid.	4. *U. Sabineae.*
Teliospores obovoid.	5. *U. illotus.*
Host belonging to family Euphorbiaceae.	
Urediniospore-wall 1.5 μ thick, or less.	6. *U. oaxacanus.*
Urediniospore-wall 1.5 μ thick, or more.	7. *U. agnatus.*
Host belonging to family Acanthaceae.	8. *U. Hariotanus.*
Host belonging to family Carduaceae.	
Teliospores globoid.	9. *U. piauhyensis.*
Teliospores oblong.	10. *U. oblongisporus.*

1. **Uromyces imperfectus** Arth. Bull. Torrey Club **47**: 472. 1920.

Uredo Bauhiniae Berk. & Curt. Proc. Am. Acad. **4**: 126. 1860.
Uromyces Bauhiniae Vesterg. Ark. Bot. 4^{15}: 21. 1905. Not *U. Bauhiniae* P. Henn. 1895.

II. Uredinia hypophyllous, scattered, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores broadly ellipsoid, 21–26 by 26–31 μ; wall dark cinnamon-brown, 1.5–2.5 μ thick, rather sparsely and strongly echinulate, the pores 3, equatorial.

III. Telia hypophyllous, scattered, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 18–21 by 19–23 μ, rounded at both ends; wall dark chestnut-brown, 3 μ thick, slightly thickened at apex, 4–4.5 μ, reticulate with meshes 1–1.5 μ wide; pedicel colorless, fragile.

ON CAESALPINIACEAE:
Bauhinia sp., Nicaragua; Jamaica.
TYPE LOCALITY: Nicaragua, on *Bauhinia* sp.
DISTRIBUTION: Nicaragua and Jamaica.
ILLUSTRATION: Ark. Bot. 4^{15}: *pl. 1, f. 4.*

2. **Uromyces guatemalensis** Vesterg. Ark. Bot. 4^{15}: 20. 1905.

II. Uredinia hypophyllous, scattered, round, minute, 0.1–0.2 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid or ellipsoid, 18–22 by 20–25 μ; wall cinnamon-brown, 1.5–2 μ thick, moderately and rather finely echinulate, the pores 4–5, sometimes 3, equatorial or somewhat scattered.

III. Telia amphigenous, scattered, round, minute, 0.1–0.2 mm. in diameter, early naked, pulverulent, dark chocolate-brown, ruptured epidermis inconspicuous; teliospores globoid or ellipsoid, 19–22 by 23–27 μ, rounded at both ends; wall chocolate-brown, rather thick, 2.5–3.5 μ, thickened at apex, 5–7 μ, reticulate with meshes about 2 μ across; pedicel fragile, colorless, about as long as spore.

ON CAESALPINIACEAE:
Bauhinia inermis Pers., Guatemala; Costa Rica.
TYPE LOCALITY: Retalhuleu, Guatemala, on *Bauhinia* sp.
DISTRIBUTION: Central America.
ILLUSTRATION: Ark. Bot. 4^{15}: *pl. 1, f. 3.*

3. **Uromyces Krameriae** Long; Arth. Bull. Torrey Club **45**: 143. 1918.

III. Telia amphigenous and caulicolous, scattered, oblong, 0.1–2 mm. long, soon opening by a longitudinal slit, loosely and prominently pulvinate, chestnut-brown, ruptured epidermis

evident; teliospores broadly ellipsoid or globoid, 21–23 by 23–29 μ, rounded at both ends; wall cinnamon-brown, rather thick, 2.5–3 μ, thickened at apex into a broad paler umbo, 6–9 μ, smooth; pedicel colorless, once or twice length of spore.

ON KRAMERIACEAE:
Krameria parvifolia Benth., Texas.
TYPE LOCALITY: Denton, Texas, on *Krameria parvifolia*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *1992*.

4. **Uromyces Sabineae** Arth. Mycologia **9**: 69. 1917.

II. Uredinia hypophyllous, scattered or somewhat gregarious on slightly reddish, effused spots, round, 0.1–0.2 mm. across, soon naked, light cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores globoid or broadly obovoid, 18–20 by 19–26 μ; wall light-yellow, thin, about 1.5 μ, moderately echinulate, the pores 3 or occasionally 4, equatorial, fairly distinct.

III. Telia hypophyllous, scattered or somewhat gregarious, pulvinate, round, 0.1–0.3 mm. across, early naked, blackish-brown, ruptured epidermis evident; teliospores globoid or broadly ellipsoid, 20–24 by 22–29 μ; wall dark chestnut-brown, moderately thick, 3 μ, thicker above, 4–7 μ, moderately verrucose; pedicel colorless, one half to once length of spore.

ON FABACEAE:
Sabinea punicea Urban, Porto Rico.
TYPE LOCALITY: Maricao, Rio Grande river, Porto Rico, on *Sabinea punicea*.
DISTRIBUTION: Known only from the type locality.

5. **Uromyces illotus** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 441. 1918.

II. Uredinia hypophyllous, scattered, round or oval, 0.2–0.5 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis rather inconspicuous; urediniospores obovoid, 16–23 by 24–27 μ; wall cinnamon-brown, moderately thick, 1.5 μ, moderately echinulate, the pores 3 or 4, equatorial or sometimes scattered.

III. Telia hypophyllous, scattered, round, 0.1–0.3 mm. across, early naked, compact, dark chocolate-brown, ruptured epidermis rather inconspicuous; teliospores obovoid or ellipsoid, 19–21 by 24–31 μ, rounded at apex and base; wall dark chestnut-brown, thick, 2–2.5 μ, thickened at apex to 5 μ, closely and finely verrucose; pedicel colorless, once and a half times spore-length.

ON FABACEAE:
Mucuna Andreana M. Micheli, Guatemala.
TYPE LOCALITY: Chinaulta, Guatemala, on *Mucuna Andreana*.
DISTRIBUTION: Known only from the type locality.

6. **Uromyces oaxacanus** Dietel & Holway; Holway, Bot. Gaz. **31**: 327. 1901.

II. Uredinia hypophyllous, scattered, round, 0.1–0.3 mm. in diameter, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores broadly ellipsoid or obovoid, 18–20 by 21–24 μ; wall golden- or cinnamon-brown, 1–1.5 μ thick, rather closely and finely echinulate, the pores 2, equatorial, rather indistinct.

III. Telia amphigenous, scattered, round, 0.1–0.3 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis evident; teliospores rather irregularly ellipsoid or globoid, 22–27 by 26–32 μ, rounded at both ends; wall chestnut-brown, rather thick, about 3 μ, thickened at apex, 4–5 μ, unevenly and coarsely verrucose especially at apex; pedicel colorless, 35–65 μ long.

ON EUPHORBIACEAE:
Bivonea urens (L.) Arth. (*Jatropha urens* L.), Oaxaca; Guatemala.
TYPE LOCALITY: Oaxaca, Mexico, on *Jatropha urens*.
DISTRIBUTION: Southern Mexico and Guatemala.

7. **Uromyces agnatus** Arth. Bull. Torrey Club **38**: 378. 1911.

II. Uredinia chiefly hypophyllous, scattered, often confluent, irregularly roundish, 0.2–0.5 mm. across, at first bullate, soon naked, pulverulent, light cinnamon-brown, ruptured epidermis conspicuous; urediniospores broadly ellipsoid, 18–23 by 21–29 μ; wall light golden-brown, rather thick, 1.5–2.5 μ, sparsely and rather inconspicuously echinulate, the pores 2, opposite and equatorial, usually distinct.

III. Telia chiefly hypophyllous, scattered, sometimes confluent, roundish, 0.1–0.4 mm. across, at first bullate, soon naked, pulverulent, dark chocolate-brown, ruptured epidermis conspicuous; teliospores ovoid or ellipsoid, 23–29 by 29–35 μ, narrowed or rounded above, rounded below; wall chestnut-brown, thick, 3–4 μ, slightly thicker above, 5–7 μ, coarsely and irregularly verrucose; pedicel colorless, slender, fragile, about length of spore.

ON EUPHORBIACEAE:
Bivonea stimulosa (Michx.) Raf. (*Cnidoscolus stimulosus* A. Gray, *Jatropha stimulosa* Michx.), Florida, South Carolina.
TYPE LOCALITY: Dunedin, Florida, on *Jatropha stimulosa*.
DISTRIBUTION: Southern South Carolina to southern Florida.

8. **Uromyces Hariotanus** Lagerh.; Arth. Mycologia **10**: 125. 1918.

III. Telia amphigenous, numerous, scattered or sometimes crowded, round or spreading, irregular, 0.2–1 mm. across, early naked, pulverulent, chocolate-brown, ruptured epidermis evident; teliospores ellipsoid, 19–21 by 26–32 μ, slightly narrowed or rounded at both ends; wall chestnut- or cinnamon-brown, thick, 3–4 μ, the apex thickened into a light-brown or colorless umbo, 6–9 μ, closely or moderately and noticeably verrucose; pedicel colorless, fragile, tapering toward the base, frequently roughened below, about one and one half times length of spore.

ON ACANTHACEAE:
Thyrsacanthus strictus Nees, Costa Rica.
TYPE LOCALITY: Guamampata, Prov. Chimborazo, Ecuador, on Acanthaceae [probably *Thyrsacanthus strictus*].
DISTRIBUTION: Costa Rica; also in South America.

9. **Uromyces piauhyensis** P. Henn. Hedwigia **47**: 266. 1908.

II. Uredinia hypophyllous, scattered, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores triangular-obovoid or flattened-globoid, 19–23 by 16–20 μ; wall cinnamon-brown, 1.5 μ thick, closely and finely echinulate, the pores 2, equatorial.

III. Telia hypophyllous, scattered, round, 0.2–0.5 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores globoid, 26–32 μ in diameter; wall dark chestnut-brown, thick, 3–5 μ, thickened at apex into a yellowish umbo, 7–10 μ, moderately and finely conic-verrucose; pedicel colorless, up to twice length of spore.

ON CARDUACEAE:
Wedelia reticulata DC., Porto Rico.
Wedelia rugosa Greenman, Cuba.
Wedelia rugosa tenuis Greenman, Cuba.
TYPE LOCALITY: Serra Nova, Piauhý, Brazil, on *Wedelia* sp.
DISTRIBUTION: West Indies; also in South America.

10. **Uromyces oblongisporus** Ellis & Ev. Bull. Torrey Club **25**: 507. 1898.

III. Telia amphigenous, scattered, round, 0.5–1 mm. in diameter, early naked, pulverulent, dark chocolate-brown, ruptured epidermis inconspicuous; teliospores oblong or ellipsoid, 18–21 by 28–35 μ, rounded above and below; wall dark chestnut-brown, 2–2.5 μ thick, thickened up to 5 μ at apex, sparsely and inconspicuously verrucose, appearing smooth below; pedicel colorless, fragile, about length of spore.

ON CARDUACEAE:
Artemisia tridentata Nutt., Wyoming.

TYPE LOCALITY: Sweetwater county, Wyoming, on *Artemisia tridentata*.
DISTRIBUTION: Known only from the type locality.

EXCLUDED SPECIES

UROMYCES PLURIANNULATUS Berk. & Curt. Grevillea **3**: 57. 1874. On *Sanicula*, from Alabama. Belongs to the *Chytridiaceae* (see Farlow, Bot. Gaz. **10**: 243. 1885, and Rhodora **10**: 12. 1908).

2. PUCCINIA.

Telia and uredinia as in *Uromyces*, except that the teliospores are two-celled, with one pore in each cell.

Genus based upon a concept, and not upon a type species.

Host belonging to family Alliaceae. — 1. *P. pagana.*
Host belonging to family Dioscoreaceae. — 2. *P. valida.*
Host belonging to family Musaceae. — 3. *P. Heliconiae.*
Host belonging to family Orchidaceae. — 4. *P. cinnamomea.*
Host belonging to family Chenopodiaceae. — 5. *P. Dondiae.*
Host belonging to family Ranunculaceae.
  Teliospore-wall coarsely verrucose. — 6. *P. Viornae.*
  Teliospore-wall smooth. — 7. *P. stromatica.*
Host belonging to family Dilleniaceae. — 8. *P. vergrandis.*
Host belonging to family Sapotaceae. — 9. *P. Johnstonii.*
Host belonging to family Asclepiadaceae. — 10. *P. Marsdeniae.*
Host belonging to family Heliotropiaceae. — 11. *P. gilva.*
Host belonging to family Verbenaceae. — 12. *P. senilis.*
Host belonging to family Scrophulariaceae.
  Urediniospore-pores 2, in occasional spores 3.
    Teliospores ellipsoid. — 13. *P. Collinsiae.*
    Teliospores oblong. — 14. *P. Antirrhini.*
  Urediniospore-pores 3. — 15. *P. Castillejae.*
Host belonging to family Bignoniaceae. — 16. *P. aequinoctialis.*
Host belonging to family Plantaginaceae. — 17. *P. pacifica.*
Host belonging to family Rubiaceae. — 18. *P. fallaciosa.*
Host belonging to family Carduaceae.
  Of the tribe Inuleae. — 19. *P. Gnaphalii.*
  Of the tribe Heliantheae.
    Teliospore-wall smooth.
      Teliospore-wall evenly thick. — 20. *P. punctoidea.*
      Teliospore-wall thicker above.
        Pedicel inflated. — 21. *P. turgidipes.*
        Pedicel cylindric.
          Teliospores oblong, obovate, or clavate.
            Urediniospore-wall thin, 1-1.5 μ.
              Urediniospore-wall minutely echinulate. — 22. *P. Tithoniae.*
              Urediniospore-wall strongly echinulate. — 23. *P. Axiniphylli.*
            Urediniospore-wall thick, 2–3 μ.
              Urediniospore-wall minutely echinulate.
                Urediniospores 23–26 × 26–32 μ. — 24. *P. nuda.*
                Urediniospores 16–23 × 24–26 μ. — 25. *P. Parthenices.*
              Urediniospore-wall prominently echinulate. — 26. *P. Guardiolae.*
          Teliospores usually ellipsoid.
            Teliospore-wall greatly thickened above, 10–12 μ. — 27. *P. Noccae.*
            Teliospore-wall somewhat thickened above, 3–9 μ.
              Teliospore-wall thick, 3–5 μ.
                Teliospores 28–32 μ broad.
                  Urediniospore-wall strongly echinulate. — 28. *P. Otopappi.*
                  Urediniospore-wall minutely echinulate. — 29. *P. Parthenii.*
                Teliospores 23–26 μ broad. — 30. *P. vaga.*
              Teliospore-wall thin, 1.5–2.5 μ. — 31. *P. Melantherae.*
    Teliospore-wall roughened.
      Teliospore-wall evenly thick. — 32. *P. globulifera.*
      Teliospore-wall thicker above.
        Teliospore-wall thin, 1.5–2.5 μ. — 33. *P. Zaluzaniae.*
        Teliospore-wall thick, 3–6 μ.
          Teliospore-wall 3–4 μ thick, 5–7 μ above.
            Urediniospore-wall 1–1.5 μ, closely echinulate. — 34. *P. nanomitra.*
            Urediniospore-wall 1.5–2.5 μ, sparsely echinulate. — 35. *P. Electrae.*
          Teliospore-wall 4–6 μ thick, 7–10 μ above. — 36. *P. Iostephanes.*
  Of the tribe Helenieae.
    Teliospore-wall smooth.
      Urediniospore-wall finely verrucose. — 37. *P. Porophylli.*
      Urediniospore-wall moderately echinulate. — 38. *P. tageticola.*
    Teliospore-wall roughened.
      Teliospores large, 30–40 μ long. — 39. *P. jaliscana.*
      Teliospores small, 26–30 μ long. — 40. *P. Eriophylli.*

Of the tribe Senecioneae. 41. *P. arnicalis.*
Of the tribe Cynareae.
Teliospore-wall considerably thickened above. 42. *P. Trixitis.*
Teliospore-wall scarcely thickened above. 43. *P. Onopordi.*

1. **Puccinia pagana** Arth. Bull. Torrey Club **38**: 372. 1911.

Allodus pagana Orton, Mem. N. Y. Bot. Gard. **6**: 181. 1916.

III. Telia amphigenous, scattered, oval, 0.1–0.4 mm. broad, 0.2–0.7 mm. long, tardily naked, cinnamon-brown, somewhat pulverulent, ruptured epidermis conspicuous; teliospores broadly ellipsoid or fusiform, 18–23 by 27–35 μ, not constricted at septum; wall cinnamon-brown, 1.5–2 μ thick, often slightly thickened above, 3–4 μ, sometimes with a pale papilla, very finely and inconspicuously verrucose, more evidently so near the apex; pedicel colorless, fragile, half length of spore or less.

ON ALLIACEAE:
Allium reticulatum G. Don, Colorado.
TYPE LOCALITY: Dead Lake, Pikes Peak, Colorado, on *Allium reticulatum.*
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Clements, Crypt. Form. Colo. *141.*

2. **Puccinia valida** Arth. Bull. Torrey Club **42**: 591. 1915.

II. Uredinia hypophyllous, scattered unevenly, irregularly rounded or somewhat elongate, 0.3–0.7 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores ellipsoid or broadly obovoid, 17–22 by 22–28 μ; wall cinnamon-brown, 1.5–2.5 μ thick, moderately or sparsely echinulate, the pores 2, slightly superequatorial.

III. Telia hypophyllous, scattered, round, 0.1–0.8 mm. in diameter, early naked, somewhat pulvinate, becoming pulverulent, dark cinnamon-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores oblong or obovoid-oblong, 13–19 by 28–39 μ, rounded above, slightly narrowed below, slightly constricted at septum; wall cinnamon-brown, thin, 1 μ, thickened at apex up to 4–7 μ, smooth; pedicel tinted, fragile, as long as spore.

ON DIOSCOREACEAE:
Dioscorea convolvulacea Schlecht. & Cham., Oaxaca.
TYPE LOCALITY: Jalapa, Mexico, on *Dioscorea convolvulacea.*
DISTRIBUTION: Known only from the type locality.

3. **Puccinia Heliconiae** (Dietel) Arth. Bull. Torrey Club **45**: 144. 1918.

Uredo Heliconiae Dietel, Hedwigia **36**: 35. 1897.

II. Uredinia hypophyllous, numerous, closely grouped or confluent, sometimes circinating on brown discolored spots, roundish, small, 0.2–0.5 mm. across, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores broadly ellipsoid or obovoid, 18–24 by 23–32 μ; wall cinnamon-brown, rather thick, 1.5–3 μ, moderately and noticeably echinulate, the pores obscure, probably 2, equatorial.

III. Telia hypophyllous, scattered, soon naked, round, 0.3–0.5 mm. across, cinnamon-brown, ruptured epidermis evident; teliospores elongate-clavate, 15–19 by 60–72 μ, rounded above, not or slightly constricted at septum; wall pale cinnamon-brown, thin, 1 μ, much thickened above, 9–13 μ, smooth; pedicel short, colorless.

ON MUSACEAE:
Bihai borinquena Griggs, Porto Rico; Martinique.
Bihai latispatha (Benth.) Griggs (*Heliconia latispatha* Benth.), Panama.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Heliconia* sp.
DISTRIBUTION: Panama and the West Indies; also in South America.

4. **Puccinia cinnamomea** Dietel & Holway; Holway, Bot. Gaz. **24**: 29. 1897.

Dasyspora cinnamomea Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

II. Uredinia not seen; urediniospores present in telia globoid, 20–29 by 24–32 μ; wall light cinnamon-brown, about 2 μ thick, moderately echinulate, the pores obscure, probably 6–8, scattered.

III. Telia hypophyllous, densely scattered on discolored areas, round, 0.3–0.7 mm. in diameter, early naked, pulvinate, cinnamon-brown or somewhat cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong or cylindric, 15–18 by 29–35 μ, rounded above and below, somewhat constricted at septum; wall brownish- or golden-yellow, thin, 1 μ, thickened 2–4 μ at apex, smooth; pedicel colorless, one-half length of spore.

ON ORCHIDACEAE:
Genus and species indet., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on "a terrestial orchid."
DISTRIBUTION: Known only from the type locality.

5. **Puccinia Dondiae** Arth. Bull. Torrey Club **42**: 592. 1915.

II. Uredinia amphigenous, scattered, round, 0.4–0.6 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis rather inconspicuous; urediniospores broadly ellipsoid, 26–29 by 32–39 μ; wall cinnamon-brown, 1.5 μ thick, closely and finely echinulate, the pores 8, scattered.

III. Telia amphigenous, scattered, round, 0.4–0.7 mm. across, early naked, pulverulent, blackish-brown, ruptured epidermis rather inconspicuous; teliospores ellipsoid, 32–39 by 42–51 μ, rounded at both ends, not constricted at septum; wall dark chocolate-brown, uniform in thickness, 4–5 μ, closely and coarsely verrucose; pedicel colorless, about as long as spore, more or less hygroscopic, swelling in water up to 32 μ wide.

ON CHENOPODIACEAE:
Dondia intermedia (S. Wats.) A. Heller (*Suaeda intermedia* S. Wats.), California.
TYPE LOCALITY: San Diego, California, on *Dondia intermedia*.
DISTRIBUTION: Known only from the type locality.

6. **Puccinia Viornae** Arth. Bull. Torrey Club **45**: 145. 1918.

II. Uredinia not seen; urediniospores in the telia, ellipsoid or elliptic-obovoid, 16–19 by 24–32 μ; wall pale golden-brown, thin, 1–1.5 μ, thicker above, 3–5 μ, closely echinulate, the pores indistinct, probably 2–4 and equatorial; paraphyses in the telia, intermixed with the spores or surrounding groups of spores, cylindric, clavate or capitate, 7–23 by 47–64 μ, the wall nearly colorless to golden-brown, darker above, thin, 1–1.5 μ, somewhat thickened above, 2–7 μ.

III. Telia caulicolous, scattered, oblong or linear, 1–3.5 mm. long, somewhat tardily naked, inclined to be pulverulent, chestnut-brown, ruptured epidermis conspicuous; paraphyses few, doubtless of uredinial origin, often wanting; teliospores ellipsoid or oblong, 16–21 by 29–35 μ, rounded at both ends, deeply constricted at septum; wall dark cinnamon-brown, uniformly 1.5–2 μ thick, moderately and coarsely echinulate-verrucose with conic warts; pedicel short, colorless, fragile.

The collection on which this species was founded also included pycnia and aecia, which were described as possibly being a part of the species. Later study makes it more probable, however, that they belong under *Dicaeoma Clematidis* (DC.) Arth. although the aeciospores are somewhat smaller than usual. The telia bear a close resemblance, as well as do the urediniospores and teliospores, to those of *Tranzschelia cohaesa*, which is only known on species of *Anemone*. Until the full life-cycle is definitely ascertained, however, the status of the species remains uncertain.

ON RANUNCULACEAE:
Viorna sp., Texas.
TYPE LOCALITY: Abilene, Texas, on *Viorna* sp.
DISTRIBUTION: Known only from the type locality.

7. **Puccinia stromatica** Berk. & Curt. Grevillea **3**: 53. 1874.

III. Telia caulicolous, crowded and confluent in groups up to 1.5 cm. long, round, small, early naked, somewhat pulverulent, the spores remaining together in a crust-like mass; rup-

tured epidermis inconspicuous; teliospores oblong or ellipsoid, 16–21 by 26–32 μ, rounded or obtuse above, rounded or somewhat narrowed below, slightly constricted at septum; wall golden- or chestnut-brown, rather thick, 1.5–2.5 μ, slightly thickened at apex up to 5 μ, smooth; pedicel slightly yellowish, up to twice length of spore.

ON RANUNCULACEAE:
Clematis sp., Alabama.
TYPE LOCALITY: North America [Alabama], on *Clematis* sp.
DISTRIBUTION: Known only from the type locality.

8. **Puccinia vergrandis** Arth. & Holway; Arth. Am. Jour. Bot. 5: 474. 1918.

II. Uredinia not seen; urediniospores in the telia obovoid, 26–32 by 32–40 μ; wall golden-brown, thick, 3 μ below, thickening gradually up to 5 μ at apex, coarsely and moderately echinulate, the pores 2–4, approximately equatorial or slightly superequatorial.

III. Telia mostly hypophyllous, confluent in round or oblong groups 2–4 mm. across, round, 0.3–1 mm. in diameter, early naked, chestnut-brown becoming cinereous from germination, ruptured epidermis evident; teliospores ellipsoid or oblong, 29–31 by 37–45 μ, rounded above, blunt below, slightly constricted at septum; wall golden- or cinnamon-brown, rather thick, 1.5–2.5 μ, thicker above, 4–7 μ, rugosely verrucose; pedicel colorless, fragile.

ON DILLENIACEAE:
Saurauja pauciserrata Hemsl., Guatemala.
TYPE LOCALITY: Colomba, Quezaltenango, Guatemala, on *Saurauja pauciserrata*.
DISTRIBUTION: Known only from the type locality.

9. **Puccinia Johnstonii** Arth. Mem. Torrey Club 17: 149. 1918.

II. Uredinia hypophyllous, scattered, roundish, small, 0.2–0.3 mm. across, tardily naked, at first opening by a pore, becoming pulverulent, cinnamon-brown, the overarching epidermis quite persistent; paraphyses peripheral in a single row, erect, arising from a short membranous base 2 or 3 cells deep, terete, 10–13 by 37–77 μ, the inner wall about 1 μ thick, the outer wall 3–7 μ, colorless, smooth; urediniospores ellipsoid or broadly obovate, 23–29 by 37–48 μ; wall cinnamon-brown, 1.5–2 μ thick, thicker above, 5–9 μ, with a lighter umbo, sparsely and strongly echinulate, the pores 4, sometimes 3, equatorial.

III. Teliospores in uredinial sori, ellipsoid or oblong, 23–30 by 33–40 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, uniformly 3 μ thick, sparsely and coarsely echinulate, the points 1–2 μ long; pedicel colorless, rough, 10 by 16–23 μ, the upper part swelling in water up to 16 μ, often attached somewhat obliquely.

ON SAPOTACEAE:
Dipholis salicifolia (L.) A. DC., Cuba.
Sideroxylon foetidissimum L., Cuba.
TYPE LOCALITY: San Diego de las Baños, Pinar del Rio, Cuba, on *Dipholis salicifolia*.
DISTRIBUTION: Western Cuba.

10. **Puccinia Marsdeniae** Dietel & Holway; Holway, Bot. Gaz. 31: 330. 1901.

II. Uredinia mostly hypophyllous, scattered, round, 0.2–0.6 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores broadly ellipsoid or globoid, 26–29 by 29–34 μ; wall golden- or cinnamon-brown, thick, 2.5–3.5 μ, moderately or sparsely and very prominently echinulate, the pores about 6, scattered, rather indistinct.

III. Telia mostly epiphyllous, scattered, round, 0.2–0.6 mm. in diameter, early naked, pulverulent, dark chocolate-brown, ruptured epidermis evident; teliospores ellipsoid, 27–32 by 35–42 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, uniformly very thick, 5–7 μ, moderately and prominently conic-verrucose; pedicel colorless, up to twice length of spore, often obliquely placed.

ON ASCLEPIADACEAE:
Marsdenia mexicana Decaisne, Morelos; Guatemala.
TYPE LOCALITY: Cuernavaca, Mexico, on *Marsdenia mexicana*.
DISTRIBUTION: Southern Mexico and Guatemala.
EXSICCATI: Barth. N. Am. Ured. *352*.

11. **Puccinia gilva** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 479. 1918.

II. Uredinia hypophyllous, scattered, round or oval, 0.2–0.6 mm. across, early naked, pulverulent, whitish or brownish, ruptured epidermis noticeable; urediniospores obovoid, 16–19 by 19–23 μ; wall light-yellow or colorless, 1–2 μ thick, closely echinulate, the pores obscure.

III. Telia hypophyllous, scattered or crowded and circinating about the uredinia, round, 0.1–0.3 mm. across, early naked, pulvinate, pale-brown, oftentimes cinereous from germination, ruptured epidermis inconspicuous; teliospores oblong, obtuse above, sometimes slightly narrowed below, slightly constricted at septum; wall yellowish- or pale golden-brown, 1–1.5 μ thick, thickened at apex, 4–7 μ, smooth; pedicel colorless, fragile.

ON HELIOTROPIACEAE:
Heliotropium physocalycinum Donn. Smith, Guatemala.
TYPE LOCALITY: Antigua, Sacatepequez, Guatemala, on *Heliotropium physocalycinum*.
DISTRIBUTION: Mountains of Guatemala.

12. **Puccinia senilis** Arth. Bull. Torrey Club **47**: 470. 1920.

II. Uredinia hypophyllous, scattered, round, 0.2–0.4 mm. in diameter, early naked, pulverulent, yellow, ruptured epidermis inconspicuous; urediniospores obovoid or broadly ellipsoid, 15–18 by 19–23 μ; wall light-yellow, 1 μ thick, sparsely echinulate, the pores very inconspicuous, apparently 3 or 4, equatorial.

III. Telia amphigenous, scattered, round, 0.1–0.3 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores ellipsoid, 18–24 by 27–40 μ, rounded at both ends, somewhat constricted at septum; wall dark chestnut-brown, 1.5–2.5 μ thick, 5–7 μ over the pores, often with a semi-hyaline cap over apex, coarsely and moderately verrucose; pedicel colorless, up to 50 μ long, tapering downward, roughened below, fragile.

ON VERBENACEAE:
Lippia myriocephala Cham. & Schlecht., Guatemala.
TYPE LOCALITY: Laguna on Lake Amatitlan, Guatemala, on *Lippia myriocephala*.
DISTRIBUTION: Known only from the type locality.

13. **Puccinia Collinsiae** P. Henn. Hedwigia **37**: 269. 1898.

II. Uredinia amphigenous, scattered, round or oval, 0.3–0.8 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 16–23 by 21–26 μ; wall cinnamon-brown, 2–2.5 μ thick, finely and rather closely echinulate, the pores 2, sometimes 3, equatorial.

III. Telia amphigenous, scattered, round or oval, 0.3–0.8 mm. across, early naked, compact, dark chestnut-brown, ruptured epidermis evident; teliospores ellipsoid or clavate-ellipsoid, 19–23 by 31–42 μ, rounded above, rounded or somewhat narrowed below, slightly constricted at septum; wall chestnut-brown, 2–2.5 μ thick, thickened above, 7–10 μ, smooth; pedicel colorless, up to 50 μ long.

In the original description aecial characters are given substantially as follows: Aecia amphigenous, crowded upon reddish spots, cupulate, small; peridial cells yellowish-white, ellipsoid, tessellate; aeciospores globoid or broadly ellipsoid, 16–19 μ; wall yellowish, appearing smooth. The portion of the original collection in the Ellis Herbarium at the New York Botanical Garden shows no aecia. No other collections have been seen that agree with this material, and there is considerable doubt about the host belonging to the genus *Collinsia*.

ON SCROPHULARIACEAE:
Collinsia sp., California.
TYPE LOCALITY: Potter Valley, Mendocino County, California, on *Collinsia* sp.
DISTRIBUTION: Known only from the type locality.

14. **Puccinia Antirrhini** Dietel & Holway; Dietel, Hedwigia **36**: 298. 1897.

Puccinia Adenostegiae Arth. Bull. Torrey Club **29**: 231. 1902.
Dasyspora Adenostegiae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dicaeoma Antirrhini H. S. Jackson, Proc. Ind. Acad. Sci. **1915**: 443. 1916.
Puccinia Cordylanthi Blasdale, Univ. Calif. Publ. Bot. **7**: 134. 1918.

II. Uredinia mostly hypophyllous or caulicolous, numerous, scattered or in concentric circles on discolored spots, sometimes crowded into irregular patches, round or irregular, 0.2–1.5 mm. in diameter, rather early naked, somewhat pulvinate becoming pulverulent, light chestnut-brown, ruptured epidermis conspicuous; urediniospores globoid, obovoid, or broadly ellipsoid, 16–24 by 21–30 μ; wall cinnamon- or light chestnut-brown, 1.5–2.5 μ thick, finely and closely echinulate, the pores for the most part 2 and equatorial, sometimes 3 and placed irregularly.

III. Telia mostly caulicolous and hypophyllous, usually occurring on stems late in season, not particularly numerous, scattered, elliptic, 0.5–1.5 mm. long, tardily naked, pulvinate, becoming somewhat pulverulent, blackish-brown, ruptured epidermis conspicuous; teliospores usually oblong or clavate-oblong, 18–29 by 36–55 μ, sometimes broadly ellipsoid, smaller, 18–26 by 29–45 μ, rounded or acute above, rounded or narrowed below, moderately constricted at septum; wall chestnut-brown above, somewhat lighter below, 1.5–2.5 μ thick, thickened to 7–10 μ above, smooth; pedicel pale-yellow or colorless, up to three times length of spore.

ON SCROPHULARIACEAE:
Adenostegia filifolia (Nutt.) Abrams (*Cordylanthus filifolius* Nutt.), California.
Adenostegia pilosa (A. Gray) Greene (*Cordylanthus pilosus* A. Gray), California.
Antirrhinum majus L., California, Colorado, Connecticut, Florida, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Missouri, New Jersey, New York, Ohio, Oregon, Pennsylvania, South Dakota, Texas, Utah, Wisconsin; British Columbia, Manitoba, Ontario; Bermuda.
Antirrhinum Nuttallianum Benth., California.
Antirrhinum Virga A. Gray, California.

TYPE LOCALITY: Berkeley, Alameda County, California, on *Antirrhinum majus*.

DISTRIBUTION: Central to southern California on native plants, and throughout the United States, Canada, and Bermuda where *Antirrhinum majus* is cultivated in the open or under glass.

EXSICCATI: Barth. Fungi Columb. *2958*; Barth. N. Am. Ured. *21*, *1634*, *2224*, *2532*; Sydow, Ured. *1364*.

15. **Puccinia Castillejae** (Dietel & Holway) Arth.; Blasdale, Univ. Calif. Publ. Bot. **7**: 133. 1919.

Uredo Castillejae Dietel & Holway; Dietel, Erythea **1**: 247. 1893.
Uredo Castillejae Tracy & Earle, Proc. Calif. Acad. Sci. **5**: 731. 1895.
Uredo utahensis Sydow; Sacc. & Syd. in Sacc. Syll. Fung. **14**: 396. 1899.

II. Uredinia amphigenous, scattered, round or oval, 0.5 mm. across, early naked, pulverulent, light cinnamon-brown, ruptured epidermis not evident; urediniospores broadly ellipsoid or globoid, 16–24 by 20–29 μ; wall golden-brown, thick, 2–3 μ, moderately or closely echinulate, the pores 3, equatorial.

III. Telia not seen; teliospores in uredinia broadly ellipsoid or ovoid, 18–23 by 23–29 μ, rounded above, slightly narrowed below, slightly or not constricted at septum; wall chestnut- or dark golden-brown, 2–3 μ thick, moderately thickened at apex, 5–7 μ, smooth; pedicel colorless, short, fragile.

ON SCROPHULARIACEAE:
Castilleja exilis A. Nelson (*C. affinis minor* A. Gray), Utah.
Castilleja foliolosa Hook. & Arn, California.
Castilleja stenantha A. Gray, California.

TYPE LOCALITY: Berkeley, California, on *Castilleja foliolosa*.

DISTRIBUTION: Southern Utah to central and southern California.

16. **Puccinia aequinoctialis** Holway, Ann. Myc. **3**: 22. 1905.

II. Uredinia usually hypophyllous, scattered or crowded on irregular discolored areas 2–3 mm. across, round or oblong, 0.1–0.8 mm. across, early naked, pulverulent, pale cinnamon-brown, ruptured epidermis noticeable; urediniospores ellipsoid or obovoid, 15–19 by 18–26 μ; wall pale golden-brown, rather thin, 1–1.5 μ, moderately and strongly echinulate, the pores obscure.

III. Telia not seen; teliospores in the uredinia broadly ellipsoid, 21–26 by 33–39 μ, rounded above and below, strongly constricted at septum; wall cinnamon-brown, uniformly thin, 1–1.5 μ, smooth; pedicel colorless, short, fragile.

ON BIGNONIACEAE:
Cydista aequinoctialis (L.) Miers (*Bignonia aequinoctialis* L.), Cuba; Porto Rico.

TYPE LOCALITY: Baracoa, Cuba, on *Bignonia aequinoctialis*.

DISTRIBUTION: Greater Antilles; also in South America.
EXSICCATI: Barth. N. Am. Ured. *525*.

17. **Puccinia pacifica** Blasdale; Arth. Bull. Torrey Club **48**: 31. 1921.

II. Uredinia amphigenous, more abundant beneath, thickly scattered, irregularly rounded, 0.3–1 mm. across, at first bullate, soon naked, somewhat pulverulent, dark chestnut-brown, ruptured epidermis very inconspicuous; urediniospores ellipsoid or obovate, 22–26 by 26–32 μ; wall chestnut-brown, 2–3 μ thick, finely echinulate, the pores 2, equatorial.

III. Telia similar to the uredinia but somewhat darker and less pulverulent; teliospores oblong or obovate-oblong, 20–24 by 38–48 μ, rounded or obtuse above, obtuse or narrowed below, somewhat constricted at septum; wall chestnut-brown, lighter below, 1–1.5 μ thick, thicker above, 3–7 μ, smooth; pedicel colorless, fragile, once or twice length of spore when unbroken, 7–9 μ in diameter.

ON PLANTAGINACEAE:
Plantago maritima L., California.
TYPE LOCALITY: Montara Point, San Mateo County, California.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *2667*.

18. **Puccinia fallaciosa** Arth. Mycologia **9**: 84. 1917.

Uredo fallaciosa Arth. Mycologia **7**: 323. 1915.

II. Uredinia hypophyllous, irregularly gregarious on somewhat discolored spots, roundish, 0.1–0.5 mm. across, tardily naked, pulverulent, fuscous; urediniospores ellipsoid or obovoid, 18–23 by 24–29 μ; wall pale-yellow or slightly fuscous, 1–1.5 μ thick, moderately echinulate, the pores obscure.

III. Telia hypophyllous, few, scattered, punctate, small, early naked, pulvinate, surrounding tissues much browned, ruptured epidermis inconspicuous; teliospores ellipsoid, 13–16 by 26–31 μ, rounded or narrowed slightly above and below, moderately constricted at septum, germinating at maturity; wall colorless or very pale-yellow, 1–1.5 μ thick, uniform, smooth; pedicel colorless, short.

ON RUBIACEAE:
Palicourea crocea (Sw.) R. & S., Porto Rico.
Palicourea riparia Benth., Porto Rico.
Psychotria patens Sw., Porto Rico.
TYPE LOCALITY: Maricao, Porto Rico, on *Psychotria patens*.
DISTRIBUTION: Porto Rico.

19. **Puccinia Gnaphalii** (Speg.) P. Henn. Hedwigia Beibl. **41**: 66. 1902.

Uredo Gnaphalii Speg. Anal. Soc. Ci. Argent. **12**: 73. 1881.
Puccinia gnaphaliicola P. Henn. Hedwigia Beibl. **38**: 68. 1899.
Puccinia Gnaphalii Speg. Anal. Mus. Nac. Buenos Aires **19**: 309. 1909.

II. Uredinia mostly hypophyllous, numerous, scattered or gregarious, occasionally concentrically arranged, roundish, 0.2–0.7 mm. across, early naked, pulverulent, pale cinnamon-brown, ruptured epidermis at first conspicuous; urediniospores globoid or broadly ellipsoid, 18–23 by 23–26 μ; wall cinnamon-brown, 1.5–2.5 μ thick, finely and closely echinulate, the pores 2, rarely 3, equatorial or slightly superequatorial.

III. Telia hypophyllous, in arrangement, size, etc., conforming to the uredinia, compact, chestnut-brown; teliospores oblong, oblong-ovate, or oblong-clavate, 18–24 by 32–56 μ, rounded or rarely somewhat acute above, narrowed below, slightly constricted at septum; wall light-brown, thickened to 8 μ at apex, smooth; pedicel colorless below, tinted above, about as long as spore; mesospores occasionally intermixed with the teliospores.

ON CARDUACEAE:
Gnaphalium purpureum L., Louisiana, South Carolina.
Gnaphalium rhodanthum Schultz-Bip., Guatemala.
Gnaphalium spathulatum Lam., Alabama, North Carolina.
TYPE LOCALITY: Chacarita, Argentina, on *Gnaphalium americanum*.
DISTRIBUTION: North Carolina to Louisiana, and in Guatemala; also in South America.

20. **Puccinia punctoidea** Sydow, Monog. Ured. **1**: 182. 1902.

II. Uredinia not seen; urediniospores globoid, 24–29 μ in diameter; wall golden-yellow, rather thin, 1–1.5 μ, sparsely and moderately echinulate, the pores 2 or possibly 3, equatorial.

III. Telia epiphyllous or amphigenous, scattered, early naked, pulvinate, small, 0.3–0.7 mm. across, chocolate-brown, somewhat pulverulent, ruptured epidermis inconspicuous; teliospores ellipsoid or obovate-ellipsoid, 20–25 by 32–42μ, rounded at both ends or somewhat narrowed below, slightly constricted at septum; wall smooth, chestnut-brown, uniformly thick, 3–3.5 μ, the pore of each cell noticeable, depressed halfway, often with internal callous; pedicel colorless, delicate, once length of spore or less, largely deciduous.

ON CARDUACEAE:
Viguiera Pringlei Rob. & Greenm., Jalisco.
TYPE LOCALITY: Hills near Zapotlan, Mexico, on *Viguiera Pringlei*.
DISTRIBUTION: Known only from the type locality.

21. **Puccinia turgidipes** H. S. Jackson, Mycologia **14**: 110. 1922.

II. Uredinia not seen; urediniospores in the telia, strongly compressed laterally, when viewed with pores in optical section, oblong, 16–18 by 26–29 μ, when in face view, globoid, 24–27 by 26–29 μ; wall dark cinnamon-brown, 2.5–3 μ thick, moderately and prominently echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous, scattered, round, small, 0.2–0.5 mm. in diameter, early naked, becoming pulverulent, blackish-brown, ruptured epidermis not noticeable; teliospores globoid or broadly ellipsoid, 30–32 by 32–38 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, 3–4 μ thick, thickened at apex to 6 μ, as well as over pore of lower cell near septum, smooth; pedicel colorless, once to twice length of spore, with thick walls above, becoming abruptly inflated 12–24 μ from point of attachment.

ON CARDUACEAE:
Viguiera deltoidea Parishii (Greene) Vasey & Rose, Arizona.
TYPE LOCALITY: Baboquivari Mountains, Arizona, on *Viguiera deltoidea Parishii*.
DISTRIBUTION: Known only from the type locality.

22. **Puccinia Tithoniae** Dietel & Holway; Holway, Bot. Gaz. **24**: 31. 1897.

II. Uredinia hypophyllous, scattered, round, small, 0.2–0.5 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis usually not conspicuous; urediniospores globoid or angularly obovoid, 19–23 by 20–26 μ; wall light cinnamon-brown, thin, 1 μ, very minutely and closely echinulate, the pores 2, slightly subequatorial.

III. Telia hypophyllous, scattered, round, small, 0.2–0.5 mm. across, usually early naked, pulvinate, chocolate-brown, ruptured epidermis usually inconspicuous; teliospores oblong or oblong-obovate, 22–26 by 34–48 μ, rounded at both ends, slightly constricted at septum; wall chestnut-brown, moderately thick, 1.5–2.5 μ, thickened above, 6–10 μ, usually with ill-defined semi-hyaline umbo, smooth; pedicel colorless, rather firm, as long as spore.

ON CARDUACEAE:
Tithonia diversifolia (Hemsl.) A. Gray, Guatemala.
Tithonia rotundifolia (Mill.) Blake (*T. speciosa* Hook., *T. tagetiflora* Desf.), Jalisco, Morelos; Costa Rica; Guatemala.
Tithonia scaberrima Benth., Guatemala.
Tithonia tubaeformis (Jacq.) Cass., Guanajuato, Hidalgo, Mexico (state); Guatemala.
TYPE LOCALITY: City of Mexico, Mexico, on *Tithonia "cubiflora,"* error for *T. tubaeformis*.
DISTRIBUTION: Southern Mexico and Central America.
EXSICCATI: Barth. Fungi Columb. *4674;* Barth. N. Am. Ured. *1274*.

23. **Puccinia Axiniphylli** Arth. Bot. Gaz. **40**: 201. 1905.

II. Uredinia not seen; urediniospores in the telia ellipsoid or globoid, 16–24 by 21–26 μ; wall yellowish, thin, 1–1.5 μ, moderately and strongly echinulate, the pores indistinct, probably 2 and equatorial.

III. Telia hypophyllous, irregularly gregarious or scattered, somewhat confluent, small, tardily and imperfectly naked, becoming somewhat pulverulent, dull chestnut-brown, ruptured

epidermis conspicuous; teliospores obovate, oblong, or clavate, irregular, large, 22–30 by 42–60 μ, obtuse or obliquely truncate above, rounded or somewhat narrowed below, slightly or not constricted at septum; wall smooth, dark cinnamon-brown, lighter below, rather thin, 1–2.5 μ, much thickened above, 7–12 μ; pedicel tinted, firm, 7–12 μ broad, equaling spore in length or usually shorter.

ON CARDUACEAE:
Axiniphyllum tomentosum Benth., Oaxaca.
TYPE LOCALITY: Oaxaca, Mexico, on *Axiniphyllum tomentosum*.
DISTRIBUTION: Southern Mexico, in vicinity of the type locality.
EXSICCATI: Barth. N. Am. Ured. *1529*.

24. **Puccinia nuda** Ellis & Ev. Jour. Myc. **3**: 57. 1887.

Puccinia Hemizoniae Ellis & Tracy, Jour. Myc. **7**: 43. 1891.
Puccinia Lagophyllae Dietel & Holway; Dietel, Erythea **1**: 250. 1893.
Dicaeoma Hemizoniae Kuntze, Rev. Gen. **3³**: 469. 1898.
Dicaeoma nudum Kuntze, Rev. Gen. **3³**: 469. 1898.
Puccinia Madiae Sydow, Monog. Ured. **1**: 121. 1902.

II. Uredinia amphigenous, scattered, round or oval, 0.5–1 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis slightly noticeable; urediniospores globoid or ellipsoid, 22–26 by 26–32 μ; wall dark or light cinnamon-brown, thick, 2.5–3 μ, very finely and closely echinulate, often appearing smooth when wet, the pores 2, opposite and equatorial.

III. Telia amphigenous, scattered, round, 1 mm. or less in diameter, early naked, pulvinate, compact, blackish-brown, ruptured epidermis noticeable; teliospores obovate-oblong or oblong, 20–26 by 32–48 μ, obtuse or rounded above, rounded or somewhat narrowed below, usually slightly constricted at septum; wall chestnut-brown, usually paler below and slightly so at apex, moderately thick, 2–2.5 μ, much thickened above, 6–10 μ, smooth; pedicel colorless, about length of spore.

ON CARDUACEAE:
Calycadenia truncata DC. (*Hemizonia truncata* A. Gray), Oregon.
Hemizonia citrina Greene, California.
Hemizonia Clevelandii Greene, California.
Hemizonia luzulaefolia DC., California.
Lagophylla congesta Greene, California.
Lagophylla ramosissima Nutt., Oregon, Washington.
Madaria elegans (D. Don) DC. (*Madia elegans* D. Don), Oregon.
Madia sativa Molina, Washington.
TYPE LOCALITY: Falcon Valley, Washington, on "*Arnica foliosa*," error for *Madia*(?) sp.
DISTRIBUTION: Washington to central California; also in South America.
EXSICCATI: Barth. N. Am. Ured. *147, 453, 848, 1060;* Ellis & Ev. Fungi Columb. *549, 1762;* Ellis & Ev. N. Am. Fungi *3142;* Sydow, Ured. *1718*.

25. **Puccinia Parthenices** H. S. Jackson, Mycologia **14**: 108. 1922.

II. Uredinia not seen; urediniospores in the telia obovate or ellipsoid, 16–23 by 24–26 μ, slightly flattened laterally; wall light cinnamon-brown, 1.5–2.5 μ thick, very finely and closely echinulate, appearing smooth when wet, the pores 2, equatorial.

III. Telia hypophyllous, rarely epiphyllous, round, 0.4–0.8 mm. across, early naked, compact, pulvinate, blackish-brown, ruptured epidermis not conspicuous; teliospores obovate, oblong, or ellipsoid, 20–26 by 32–45 μ, rounded or obtuse above, rounded below, slightly constricted at septum; wall light chestnut-brown, 1.5–2.5 μ thick, thickened 7–9 μ at apex by a broad semi-hyaline umbo, similarly thickened over pore of lower cell at septum, smooth; pedicel colorless, firm, once to thrice length of spore.

ON CARDUACEAE:
Parthenice mollis A. Gray, Arizona.
TYPE LOCALITY: Fort Lowell, Arizona, on *Parthenice mollis*.
DISTRIBUTION: Southern Arizona.

26. **Puccinia Guardiolae** Dietel & Holway; Holway, Bot. Gaz. **31**: 334. 1901.

II. Uredinia hypophyllous, scattered or gregarious, round, small, 0.2–0.5 mm. in diameter,

somewhat tardily naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; urediniospores obovate or globoid, flattened laterally, when viewed with pores in face view 20–26 by 23–28 μ, when in side view 16–20 by 23–28 μ; wall dark cinnamon-brown, 2–2.5 μ thick, moderately and prominently echinulate, the pores 2, equatorial.

III. Telia not seen; teliospores occasional in the uredinia, oblong, clavate, or obovoid, 20–24 by 38–48 μ, rounded above, rounded or somewhat narrowed below, noticeably constricted at septum; wall light cinnamon-brown, thin, 1.5–2 μ, lighter above and thicker, 3–5 μ, smooth; pedicel colorless, equaling spore or shorter.

ON CARDUACEAE:
Guardiola mexicana Humb. & Bonpl., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Guardiola mexicana*.
DISTRIBUTION: Known only from the type locality.

27. **Puccinia Noccae** Arth. Bot. Gaz. **40**: 202. 1905.

Puccinia Lagascaeae Speg. Anal. Mus. Nac. Buenos Aires **19**: 307. 1909.

II. Uredinia amphigenous, scattered, round, small, 0.25 mm. across, soon naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid or broadly obovoid in face view, 24–26 by 23–26 μ, flattened laterally and cuneate in side view, 19–24 by 23–26 μ; wall cinnamon-brown, 1.5–2 μ thick, closely and evenly echinulate, the pores 2, near hilum.

III. Telia amphigenous, scattered, round, small, 0.25 mm. across, soon naked, becoming pulverulent, blackish, ruptured epidermis inconspicuous; teliospores broadly oblong or ellipsoid, 26–31 by 32–42 μ, rounded at both ends, or somewhat obtuse above, not constricted at septum in the thicker walled spores, prominently so in the thinner ones; wall dark chestnut-brown, 2–4 μ thick, thickened to 10–12 μ by a low semi-hyaline umbo over pore of upper cell and often similarly over pore of lower cell, smooth; pedicel colorless, firm, once to once and a half length of spore.

ON CARDUACEAE:
Nocca decipiens (Hemsl.) Kuntze (*Lagasca decipiens* Hemsl.), Jalisco.
Nocca rigida Cav. (*Lagasca suaveolens* H.B.K.), Guatemala; Oaxaca, Morelos.
TYPE LOCALITY: Sayula, Jalisco, Mexico, on *Nocca decipiens*.
DISTRIBUTION: Southern Mexico to Guatemala; also in South America.

28. **Puccinia Otopappi** Sydow, Monog. Ured. **1**: 129. 1902.

II. Uredinia not seen; urediniospores in the telia, globoid or ellipsoid, 21–27 by 24–30 μ; wall cinnamon-brown, 2.5–3 μ thick, strongly and sparsely echinulate, the pores 2, equatorial.

III. Telia chiefly epiphyllous, scattered, small, round, 0.2–0.5 mm. across, blackish, somewhat tardily naked, becoming pulverulent, ruptured epidermis noticeable; teliospores ellipsoid, 28–32 by 38–48 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, thick, 3–5 μ, thickened to 6–7 μ above by a lighter colored layer and over pore of lower cell, which is usually placed midway between pedicel and septum, smooth; pedicel colorless, fragile, equaling spore or shorter.

ON CARDUACEAE:
Otopappus alternifolius B. L. Robinson, San Luis Potosí.
TYPE LOCALITY: San José Pass, Mexico, on *Otopappus alternifolius*.
DISTRIBUTION: Known only from the type locality.

29. **Puccinia Parthenii** (Speg.) Arth. Bull. Torrey Club **37**: 570. 1910.

Uredo Parthenii Speg. Anal. Mus. Nac. Buenos Aires **6**: 239. 1899.

II. Uredinia amphigenous, scattered or gregarious, round or oval, 0.3–0.5 mm. across, somewhat tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or ellipsoid, 20–24 by 23–32 μ, often distorted and irregular, some spores much enlarged; wall cinnamon-brown, 2–3.5 μ thick, moderately and very finely echinulate, appearing almost smooth when wet, the pores 2 or 3, equatorial or irregularly disposed.

III. Telia not seen; teliospores occasional in the uredinia, semi-opaque, ellipsoid, 28–32 by 38–48 μ, rounded or obtuse above, rounded below, not constricted at septum; wall chocolate-brown, 4–5 μ thick, thicker above, 6–9 μ, by a broad sub-hyaline umbo, similarly thickened

over pore of lower cell at septum, smooth; pedicel colorless, fragile, once length of spore.

ON CARDUACEAE:
Parthenium argentatum A. Gray, Zacatecas.
Parthenium Hysterophorus L., Mexico (state); Bermuda.
Parthenium incanum H.B.K., Texas.
TYPE LOCALITY: Tecumán, Córdova, Argentina, on *Parthenium Hysterophorus*.
DISTRIBUTION: Southern Texas to southern Mexico; Bermuda; also in South America.

30. **Puccinia vaga** H. S. Jackson, Mycologia **14**: 112. 1922.

II. Uredinia hypophyllous, becoming somewhat amphigenous, scattered, round, small 0.2–0.4 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly obovoid, 21–24 by 23–26 μ; wall light cinnamon-brown, thin, 1–1.5 μ, moderately and prominently echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous, scattered, round, small, 0.2–0.5 mm. in diameter, early naked, pulvinate, becoming somewhat pulverulent, blackish-brown, ruptured epidermis evident; teliospores broadly or narrowly ellipsoid, 23–26 by 27–48 μ, rounded at both ends, slightly constricted at septum; wall reddish chocolate-brown, concolorous, medium-thick, 3–4 μ, slightly thicker above, 4–6 μ; pedicel colorless, about twice length of spore.

ON CARDUACEAE:
Verbesina sp., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Verbesina* sp.
DISTRIBUTION: Known only from the type locality.

31. **Puccinia Melantherae** P. Henn. Hedwigia **36**: 214. 1897.

II. Uredinia hypophyllous, round, small, 0.1–0.3 mm. in diameter, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid, obovoid, or triangular, 19–22 by 19–24 μ; wall golden-brown, 1–1.5 μ thick, moderately echinulate, the pores 2, approximately equatorial.

III. Telia hypophyllous, round, 0.5–0.8 mm. in diameter, early naked, pulvinate, becoming somewhat pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores ellipsoid, 20–26 by 32–38 μ, rounded above and below, noticeably constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, somewhat lighter and thicker above, 4–6 μ, smooth; pedicel colorless, flexuous, twice length of spore, or more commonly shorter.

ON CARDUACEAE:
Melanthera nivea (L.) Small, Guatemala.
TYPE LOCALITY: Santa Catharina, Brazil, on *Melanthera deltoidea*.
DISTRIBUTION: Central Guatemala; also in South America.

32. **Puccinia globulifera** Arth. Bot. Gaz. **40**: 200. 1905.

II. Uredinia hypophyllous, round, small, 0.2–0.3 mm. in diameter, scattered, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid, small, 15–18 μ in diameter; wall moderately thick, 2 μ, cinnamon-brown, closely and strongly echinulate, the pores 2, approximately opposite in the equator.

III. Telia amphigenous, round, small, 0.2–0.3 mm. in diameter, scattered, early naked, somewhat pulverulent, blackish, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 22–25 by 24–32 μ, semiopaque, rounded at both ends, not constricted at septum; wall dark chocolate-brown, uniformly thick, 3 μ, closely and evenly aculeate with strong, conic points; pedicel colorless except near the spore, slender, firm, 5–6 μ thick, twice length of spore or longer, the place of insertion usually at or near the septum.

ON CARDUACEAE:
Otopappus epaleaceus Pringlei Greenman, Guerrero.
TYPE LOCALITY: Iguala, Mexico, on *Otopappus epaleaceus Pringlei*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *143*.

33. **Puccinia Zaluzaniae** Arth. Bot. Gaz. **40**: 205. 1905.

II. Uredinia chiefly epiphyllous, scattered, round, small, 0.3 mm. or less in diameter,

soon naked, ruptured epidermis noticeable; urediniospores obovate, 16–21 by 23–27μ; wall golden-brown, rather thin, 1.5–2μ, sparsely and finely echinulate, the pores 2, opposite and equatorial.

III. Telia chiefly epiphyllous, scattered, very small, 0.3 mm. or less across, usually punctiform, often confluent, early naked, becoming somewhat pulverulent, blackish-brown, ruptured epidermis not conspicuous; teliospores ellipsoid, 21–27 by 39–45 μ, obtuse or rounded above, rounded or sometimes narrowed below, slightly or not constricted at septum; wall dark chocolate-brown, minutely verrucose-rugose, moderately thick, 1.5–2.5 μ, thicker above, 3–5 μ, concolorous; pedicel colorless except next the spore, firm, tapering downward, twice length of spore, lowest third noticeably roughened.

ON CARDUACEAE:
Zaluzania asperrima Schultz-Bip., Puebla.
TYPE LOCALITY: Tehuacan, Mexico, on *Zaluzania asperrima*.
DISTRIBUTION: Known only from the type locality.

34. **Puccinia nanomitra** Sydow, Monog. Ured. 1: 182. 1902.

II. Uredinia chiefly hypophyllous, scattered, round, small, 0.2–0.5 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores obovate, 24–26 by 26–30 μ; wall cinnamon-brown, thin, 1–1.5 μ, finely and closely echinulate, the pores 2, opposite and equatorial.

III. Telia chiefly epiphyllous, scattered, round, small, 0.2–0.5 mm. in diameter, soon naked, blackish, pulverulent, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 26–30 by 35–42 μ, semiopaque in water, rounded at both ends, not constricted at septum; wall chocolate-brown, 3–4 μ thick, closely and moderately verrucose, thickened by a lighter colored umbo to 5–7 μ at apex and over pore of lower cell which is usually placed midway between septum and pedicel; pedicel colorless, often attached obliquely, once to twice length of spore.

ON CARDUACEAE:
Viguiera eriophora Greenman, Oaxaca.
Viguiera helianthoides H.B.K. (*V. dentata* Spreng.), Oaxaca.
TYPE LOCALITY: Oaxaca, Mexico, on *Viguiera dentata*.
DISTRIBUTION: Southern Mexico in vicinity of the type locality.
EXSICCATI: Barth. Fungi Columb. *4668;* Barth. N. Am. Ured. *1260*.

35. **Puccinia Electrae** Dietel & Holway; Holway, Bot. Gaz. 31: 333. 1901.

Puccinia Coreopsidis Jackson & Holway; Arth. Am. Jour. Bot. 5: 536. D 1918. Not *P. Coreopsidis* Wakefield, Au 1918.
Puccinia additicia Jackson & Holway; Arth. Bull. Torrey Club 48: 32. 1921.

II. Uredinia amphigenous, scattered or somewhat gregarious, circular or oval, 0.2–0.5 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis membranous and conspicuous; urediniospores obovoid, 20–26 by 28–32 μ; wall golden-brown, 1.5–2.5 μ thick, prominently and sparsely echinulate, the pores 2, slightly superequatorial.

III. Telia amphigenous, scattered, circular or oval, 0.2–0.8 mm. across, early naked, pulverulent, dark chestnut-brown, ruptured epidermis conspicuous; teliospores oblong or narrowly ellipsoid, 23–28 by 35–45 μ, rounded above, rounded or slightly narrowed below, slightly constricted at septum; wall dark chestnut-brown, 3–4 μ thick, slightly thickened above, 5–7 μ, strongly and sparsely verrucose; pedicel slightly tinted next the spore, otherwise colorless, firm, twice length of spore, lower third noticeably roughened.

ON CARDUACEAE:
Coreopsis mutica DC. (*C. mexicana* Hemsl., *Electra Galeottii* A. Gray), Oaxaca; Guatemala.
TYPE LOCALITY: Oaxaca, Mexico, on *Electra Galeottii*.
DISTRIBUTION: Southern Mexico and Guatemala.
EXSICCATI: Barth. N. Am. Ured. *1439;* Sydow, Ured. *2022*.

36. **Puccinia Iostephanes** Dietel & Holway; Holway, Bot. Gaz. 31: 334. 1901.

II. Uredinia not seen; urediniospores obovoid or cuneate, 22–26 by 23–30 μ, slightly

flattened laterally; wall cinnamon-brown, rather thick, 1.5–2 μ, moderately and strongly echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous, chiefly epiphyllous, scattered, round, 0.5–1 mm. across, somewhat tardily naked, becoming pulverulent, chocolate-brown, ruptured epidermis noticeable; teliospores ellipsoid, 26–32 by 40–48 μ, rounded at both ends, slightly or not constricted at septum; wall 4–6 μ thick, of two rather distinct layers, the inner wall dark chestnut-brown, the outer wall golden-yellow, closely and moderately verrucose, thickened to 7–10 μ at apex and over pore of lower cell which is usually near the pedicel; pedicel colorless, fragile, 6–8 μ in diameter at point of attachment to the spore, often attached obliquely, once to twice length of spore, tapering and somewhat rugose below.

ON CARDUACEAE:
Iostephane heterophylla Benth., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Iostephane heterophylla*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. Fungi Columb. *3849;* Barth. N. Am. Ured. *455*.

37. **Puccinia Porophylli** P. Henn. Hedwigia Beibl. **39**: 153. 1900.

II. Uredinia chiefly hypophyllous, scattered, round or oval, 0.2–0.5 mm. across, tardily naked, somewhat pulverulent, pale cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 18–22 by 20–26 μ; wall pale golden-brown or nearly colorless, thin, 1.5–2 μ, very finely and closely verrucose-echinulate, the pores obscure, apparently 6–8, scattered.

III. Telia chiefly hypophyllous and caulicolous, round or oval, small, 0.2–1 mm. across, tardily naked, pulvinate, blackish, ruptured epidermis conspicuous; teliospores ellipsoid or obovoid, 22–30 by 32–45 μ, obtuse or rounded at both ends, slightly or not constricted at septum; wall chocolate-brown, thick, 2.5–3.5 μ, slightly thicker above, 4–7 μ, very obscurely verrucose-rugose when dry, appearing smooth when wet; pedicel colorless, slightly tinted next to spore, once to thrice length of spore.

ON CARDUACEAE:
Porophyllum macrocephalum DC., Hidalgo, Morelos.
Porophyllum sp., Jalisco.
TYPE LOCALITY: Caracas, Venezuela, on *Porophyllum ellipticum*.
DISTRIBUTION: Southern Mexico; also in northern South America.
EXSICCATI: Barth. N. Am. Ured. *1168*.

38. **Puccinia tageticola** Dietel & Holway; Holway, Bot. Gaz. **24**: 26. 1897.

II. Uredinia amphigenous and caulicolous, round or oval, 0.2–1 mm. across, somewhat tardily naked, pulverulent, cinnamon-brown, ruptured epidermis usually conspicuous; urediniospores ellipsoid or obovate, somewhat flattened laterally, 16–24 by 26–30 μ; wall golden-brown, thin, 1.5–2 μ, moderately and rather finely echinulate, the pores 2, equatorial.

III. Telia amphigenous and caulicolous, round or elongate, 0.5–5 mm. long, tardily naked, pulvinate, blackish, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 26–34 by 40–50 μ, occasionally narrower and longer in caulicolous sori, rounded at both ends, slightly or not constricted at septum; wall chestnut-brown, thick, 3–5 μ, thicker above, 7–10 μ, with a broad sub-hyaline umbo; pedicel colorless, firm, usually thick-walled, twice or thrice length of spore.

ON CARDUACEAE:
Tagetes erecta L., Porto Rico.
Tagetes filifolia Lag., Jalisco, Morelos; Costa Rica.
Tagetes lucida Cav., Michoacan, Morelos.
Tagetes micrantha Cav., Mexico (state).
Tagetes microglossa Benth., Costa Rica.
Tagetes patula L. (*T. tenuifolia* H.B.K.), Aguascalientes, Jalisco, Mexico (state), Oaxaca; Porto Rico.
TYPE LOCALITY: Guadalajara, Mexico, on *Tagetes tenuifolia*.
DISTRIBUTION: Central Mexico southward through Central America, and in Porto Rico; also in South America.
EXSICCATI: Barth. N. Am. Ured. *64, 370, 1374;* Sydow, Ured. *1987*.

39. **Puccinia jaliscana** Arth. Bot. Gaz. **40**: 202. 1905.

II. Uredinia hypophyllous, round, very small, 0.1–0.3 mm. in diameter, soon naked, pale-yellowish, somewhat pulverulent, ruptured epidermis scarcely noticeable; urediniospores globoid or broadly ellipsoid, 18–24 by 20–26 μ; wall pale cinnamon-brown or nearly colorless, rather thin, 1.5–2 μ, very finely and closely verrucose-echinulate, the pores obscure, apparently 6–8, scattered.

III. Telia amphigenous, chiefly hypophyllous, round, small, 0.2–0.5 mm. in diameter, early naked, blackish, somewhat pulverulent, ruptured epidermis not conspicuous; teliospores ellipsoid, 20–24 by 30–40 μ, rounded at both ends, slightly constricted at septum, semi-opaque; wall chocolate-brown, 2.5–3 μ thick, thicker above, 4–6 μ, prominently and closely verrucose; pedicel colorless, firm, once to twice length of spore.

ON CARDUACEAE:
Porophyllum Holwayanum Greenman, Jalisco.
TYPE LOCALITY: Sayula, Mexico, on *Porophyllum Holwayanum*.
DISTRIBUTION: Known only from the type locality.

40. **Puccinia Eriophylli** H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 246. 1918.

Uredo abdita H. S. Jackson, Mycologia **14**: 120. 1922.

II. Uredinia amphigenous and caulicolous, scattered, small, rounded, 0.3–0.6 mm. across, early naked, pulverulent, pulvinate, chestnut-brown, ruptured epidermis conspicuous; urediniospores globoid, obovoid, or oblong, 21–27 by 26–29 μ; wall chestnut-brown, 2–3 μ thick, moderately and finely echinulate, the pores 2, approximately equatorial.

III. Telia amphigenous, scattered, small, round, 0.3–0.6 mm. across, early naked, compact, pulvinate, blackish-brown, ruptured epidermis inconspicuous; teliospores ellipsoid or oblong, 18–21 by 26–30 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, 2–2.5 μ thick, uniform, minutely and obscurely verrucose; pedicel colorless, deciduous.

ON CARDUACEAE:
Eriophyllum lanatum (Pursh) Forbes, Oregon.
Eriophyllum leucophyllum (DC.) Rydb., Oregon.
Eriophyllum Nevinii A. Gray, California.
Eriophyllum staechadifolium Lag., California.
Eriophyllum trifidum (Nutt.) Rydb. (*E. confertifolium trifidum* A. Gray), California.
TYPE LOCALITY: Wren, Benton County, Oregon, on *Eriophyllum lanatum*.
DISTRIBUTION: Northern Oregon to southern California.

41. **Puccinia arnicalis** Peck, Bot. Gaz. **6**: 227. 1881.

Dicaeoma arnicale Kuntze, Rev. Gen. **3**[3]: 467. 1898.

II. Uredinia amphigenous, chiefly epiphyllous, scattered or gregarious, sometimes confluent, round or oval, 0.2–0.5 mm. across, early naked, cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or ellipsoid, flattened laterally, when viewed with pores in face-view, 20–26 by 26–32 μ, when pores in side-view, 16–18 by 26–32 μ; wall light chestnut-brown, moderately thick, 1.5–2 μ, very minutely and closely echinulate, appearing nearly smooth when wet, the pores 2, opposite and considerably superequatorial.

III. Telia at first epiphyllous, becoming amphigenous, in open and irregular groups 2–5 mm. across, or extending for considerable distances along petioles or midribs, often scattered, round, 0.4–0.8 mm. in diameter, early naked, becoming pulverulent, chestnut-brown, ruptured epidermis inconspicuous; teliospores ellipsoid or obovate-ellipsoid, 18–26 by 28–38 μ, rounded above, rounded or narrowed below, slightly or not constricted at septum; wall light chestnut-brown, uniformly thin, 1–2 μ, minutely and closely verrucose, the pore of upper cell often depressed half way to septum, the pore of lower cell usually about half way between septum and pedicel; pedicel colorless, very short, deciduous.

ON CARDUACEAE:
Arnica cordifolia Hook., Colorado, Oregon, Utah.

Arnica diversifolia Greene (*A. latifolia viscidula* A. Gray), California, Oregon.
Arnica latifolia Bong., Montana.
Arnica pedunculata Rydb., Utah.
Arnica rhizomata A. Nelson, Utah.
Arnica subplumosa Greene, Colorado,

Type locality: Colorado, on *Arnica cordifolia*.

Distribution: Mountains of Colorado to central California, and northward to northwestern Montana and Oregon.

Exsiccati: Clements, Crypt. Form. Colo. *546;* Ellis & Ev. Fungi Columb. *1846;* Garrett, Fungi Utah. *25, 26, 27;* Sydow, Ured. *1906, 1907.*

42. **Puccinia Trixitis** (Kern & Kellerm.) Arth. Am. Jour. Bot. **5**: 534. 1918.

Uredo Trixitis Kern & Kellerm. Jour. Myc. **13**: 26. 1907

II. Uredinia hypophyllous, scattered, round or oval, 0.3–1 mm. across, early naked, pulverulent, dark chestnut-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly ellipsoid, 21–26 by 24–31 μ; wall dark cinnamon- or light chestnut-brown, 1.5–3 μ thick, sparsely or moderately echinulate, the pores 2, approximately equatorial.

III. Telia hypophyllous, scattered, round or oval, 0.2–0.8 mm. across, early naked, compact, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 16–21 by 29–45 μ, rounded above, slightly narrowed below, constricted at septum; wall cinnamon-brown, 1–2 μ thick, thickened above, 4–7 μ, smooth; pedicel colorless, up to one and a half times length of spore.

On Carduaceae:
Trixis frutescens P. Br., Guatemala.

Type locality: San Lucas, Solola, Guatemala, on *Trixis frutescens*.

Distribution: Central Guatemala.

43. **Puccinia Onopordi** Sydow, Monog. Ured. **1**: 128. 1902.

II. Uredinia amphigenous and caulicolous, round or oval, small, 0.2–1 mm. across, somewhat tardily naked, pulverulent, light cinnamon-brown, ruptured epidermis usually noticeable; urediniospores globoid or ellipsoid, 23–26 by 26–32 μ; wall cinnamon-brown, 2 μ thick, rather closely and finely echinulate, the pores 3, approximately equatorial.

III. Telia amphigenous and caulicolous, round or oval, small, 0.2–1 mm. across, somewhat tardily naked, pulvinate, becoming somewhat pulverulent, chestnut-brown, ruptured epidermis usually noticeable; teliospores broadly ellipsoid or oblong, 22–26 by 32–48 μ, rounded above and below, slightly or not constricted at septum; wall thin, 1–1.5 μ, dark cinnamon-brown, sometimes slightly thickened over pore of each cell, 3–4 μ, very finely verrucose, appearing almost smooth when wet; pedicel colorless, fragile, equaling spore or shorter.

On Carduaceae:
Onopordon Acanthium L., Nova Scotia.

Type locality: Aintab, Syria, on *Onopordon Carduncul*us.

Distribution: Nova Scotia; also in southwestern Asia.

Doubtful or excluded species

Puccinia Bullaria Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832. (Not *P. Bullaria* Link, 1825.) This fungus is on *Hyssopus nepetoides*, and may be the early stage of some ascomycete.

Puccinia furfuracea Ellis & Gall. Incidentally mentioned by Dietel (Hedwigia **37**: 202. 1898) as from Mexico; doubtless a hyponym.

Puccinia incarcerata Lév., reported from Cuba, on petioles of *Cissus*, probably belongs to the *Ustilaginaceae*, and is usually recorded as *Mycosyrinx Cissi* (DC.) G. Beck.

3. UREDO.

Uredinia subepidermal, definite, erumpent, sometimes surrounded by paraphyses or peridium. Urediniospores borne singly on pedicels, from which they readily separate, leaving a hilum, 1-celled; wall colored or colorless, echinulate, or in a few species verrucose, the pore one or more, variously disposed. Sometimes accompanied by pycnia, by aecia, or by both.

Genus based upon a concept, and not upon a type species.

Host belonging to family Pinaceae. — 1. *U. Holwayi.*
Host belonging to family Araceae — 2. *U. Anthurii.*
Host belonging to family Commelinaceae. — 3. *U. Commelyneae.*
Host belonging to family Dioscoreaceae. — 4. *U. Dioscoreae.*
Host belonging to family Iridaceae. — 5. *U. nominata.*
Host belonging to family Orchidaceae.
  Sori superficial; hyphae emerging through stomata. — 6. *U. Behnickiana.*
  Sori subepidermal, erumpent.
    Urediniospore-wall rather thin (1.5–2.5 μ). — 7. *U. Gynandrearum.*
    Urediniospore-wall rather thick (2–3 μ).
      Sori round, tardily naked.
        Sori small; urediniospores 23–29 μ long. — 8. *U. pustulata.*
        Sori large, bullate; urediniospores 29–37 μ long. — 9. *U. Guacae.*
      Sori large and flat, early naked. — 10. *U. nigropuncta.*
Host belonging to family Piperaceae. — 11. *U. Piperis.*
Host belonging to family Artocarpaceae.
  Paraphyses short and inconspicuous. — 12. *U. rubescens.*
  Paraphyses united at bases into a membrane. — 13. *U. Artocarpi.*
Host belonging to family Loranthaceae. — 14. *U. Phorodendri.*
Host belonging to family Polygonaceae. — 15. *U. Coccolobae.*
Host belonging to family Chenopodiaceae.
  Urediniospores large (32–42 μ), with wall thicker above. — 16. *U. Grayiae.*
  Urediniospores smaller (23–29 μ), with wall uniform. — 17. *U. Spirostachydis.*
Host belonging to family Amaranthaceae.
  Urediniospores echinulate, with 2 pores. — 18. *U. Cyathulae.*
  Urediniospores verrucose, with 3 or 4 pores. — 19. *U. maculans.*
Host belonging to family Petiveriaceae. — 20. *U. panamensis.*
Host belonging to family Corrigiolaceae. — 21. *U. Paronychiae.*
Host belonging to family Annonaceae. — 22. *U. Cherimoliae.*
Host belonging to family Amygdalaceae. — 23. *U. Licaniae.*
Host belonging to family Mimosaceae. — 24. *U. curvata.*
Host belonging to family Caesalpiniaceae.
  Urediniospore-wall 1 μ thick below, 2–4 μ above. — 25. *U. Hymenaeae.*
  Urediniospore-wall uniformly thick.
    Urediniospores large (26–29 μ), wall cinnamon-brown. — 26. *U. lutea.*
    Urediniospores smaller (19–26 μ), wall nearly colorless. — 27. *U. bauhiniicola.*
Host belonging to family Geraniaceae. — 28. *U. unilateralis.*
Host belonging to family Erythroxylaceae. — 29. *U. Erythroxylonis.*
Host belonging to family Meliaceae. — 30. *U. Trichiliae.*
Host belonging to family Polygalaceae. — 31. *U. peribebuyensis.*
Host belonging to family Euphorbiaceae.
  Urediniospore-wall cinnamon-brown, pores 3. — 32. *U. Saviae.*
  Urediniospore-wall nearly colorless, pores obscure. — 33. *U. jatrophicola.*
Host belonging to family Ochnaceae. — 34. *U. Sauvagesiae.*
Host belonging to family Clusiaceae. — 35. *U. Clusiae.*
Host belonging to family Bixaceae. — 36. *U. Bixae.*
Host belonging to family Flacourtiaceae. — 37. *U. recondita.*
Host belonging to family Loasaceae. — 38. *U. floridana.*
Host belonging to family Lythraceae. — 39. *U. Cupheae.*
Host belonging to family Onagraceae. — 40. *U. Fuchsiae.*
Host belonging to family Sapotaceae.
  Urediniospore-wall hygroscopic, tuberculate. — 41. *U. Lucumae.*
  Urediniospore-wall firm, echinulate.
    Urediniospore-wall uniformly thin (1.5–2 μ). — 42. *U. Sapotae.*
    Urediniospore-wall thick (2–3 μ), thicker above. — 43. *U. amicosa.*
Host belonging to family Convolvulaceae. — 44. *U. laeticolor.*
Host belonging to family Hydrophyllaceae. — 45. *U. contraria.*
Host belonging to family Lamiaceae; urediniospore-pores basal.
  Urediniospore-wall thicker above, pores 2. — 46. *U. sphacelicola.*
  Urediniospore-wall uniformly thick.
    Urediniospore-pores 1. — 47. *U. degener.*
    Urediniospore-pores 2. — 48. *U. biporula.*
Host belonging to family Solanaceae. — 49. *U. Nicotianae.*
Host belonging to family Scrophulariaceae. — 50. *U. cumula.*
Host belonging to family Rubiaceae.
  Uredinia with peripheral paraphyses. — 51. *U. sabiceicola.*
  Uredinia without paraphyses.
    Urediniospore-wall pale-yellow. — 52. *U. Hameliae.*
    Urediniospore-wall cinnamon-brown.

Urediniospore-wall very thin, 1 μ.	53. *U. Rondeletiae.*
Urediniospore-wall thicker, 1–1.5 μ.	54. *U. Cephalanthi.*
Host belonging to family Valerianaceae.	55. *U. Reicheana.*
Host belonging to family Carduaceae.	
Uredinia without paraphyses.	
Urediniospore-wall colorless (tribe Vernonieae).	56. *U. Sparganophori.*
Urediniospore-wall cinnamon- or chestnut-brown.	
Urediniospore-wall thick, 2–2.5 μ (tribe Eupatorieae).	57. *U. suspecta.*
Urediniospore-wall thin, 1–2 μ (tribe Heliantheae).	
Urediniospores medium-size, 24–29 μ long.	58. *U. vicina.*
Urediniospores small, 18–22 μ long.	59. *U. Garcilassae.*
Uredinia with prominent paraphyses (tribe Mutisieae).	60. *U. Wilsoni.*

1. **Uredo Holwayi** Arth. Bull. Torrey Club **33**: 518. 1906.

O. Pycnia hypophyllous, numerous, scattered, inconspicuous, subcuticular, pale-yellow becoming brownish, discoidal or sometimes columnar, 80–112 μ in diameter by 40–70 μ high.

II. Uredinia hypophyllous, from a limited mycelium, in two rows on yellow spots occupying part or all of a leaf, subepidermal, round or oval, 0.1–0.3 mm. across, brownish-yellow, dehiscent by a small central orifice, ruptured epidermis not noticeable; paraphyses united to form a hemispheric pseudoperidium, free at the orifice, clavate-capitate, 10–14 μ wide, the wall 3–4 μ thick; urediniospores broadly ellipsoid or obovoid, 15–19 by 21–26 μ; wall nearly colorless, rather thick, 2–3 μ, conspicuously or moderately echinulate below, finely echinulate or smooth above, the pores about 4, scattered, obscure.

ON PINACEAE:
Tsuga heterophylla (Raf.) Sarg., Alaska, Idaho, Montana; British Columbia.
Tsuga Mertensiana (Bong.) Carr., British Columbia.
TYPE LOCALITY: Glacier, British Columbia, on "*Tsuga Mertensiana*," error for *T. heterophylla*.
DISTRIBUTION: Northern Idaho and British Columbia to southeastern Alaska.

2. **Uredo Anthurii** (Hariot) Sacc. Syll. Fung. **11**: 229. 1895.

Caeoma Anthurii Hariot, Jour. de Bot. **6**: 458. 1892.

II. Uredinia chiefly hypophyllous, scattered, or somewhat grouped on slightly discolored spots, bullate, the membranous epidermis tardily breaking away, pale, somewhat pulverulent, 0.5–0.8 mm. across; peridium and paraphyses none; urediniospores irregularly obovoid, 18–26 by 29–37 μ; wall colorless or nearly so, thin, 1–1.5 μ, moderately echinulate, the pores obscure.

ON ARACEAE:
Anthurium scandens (Aubl.) Engler, Porto Rico.
TYPE LOCALITY: Greenhouses of Jardin des Plantes in Paris, on *Anthurium* sp.
DISTRIBUTION: Porto Rico; also in greenhouses of France.

3. **Uredo Commelyneae** Kalchbr. Grevillea **11**: 24. 1882.

II. Uredinia hypophyllous, scattered, round or mammillose, 0.1–0.4 mm. in diameter, dark cinnamon-brown, long covered by the epidermis, finally opening by a small central pore; paraphyses united by their bases and imbricated to form a pseudoperidium, clavate or capitate, 8–12 μ wide, the wall colorless or golden-brown, thickened up to 4 μ, frequently thinner on one side, smooth; urediniospores angular-ellipsoid, 15–23 by 19–29 μ; wall colorless, thin, 1–2 μ, closely and finely echinulate or verrucose-echinulate, the pores obscure.

ON COMMELINACEAE:
Commelina elegans H.B.K., Porto Rico; St. Thomas.
Commelina longicaulis Jacq., Porto Rico.
TYPE LOCALITY: Port Natal, South Africa, on *Commelina* sp.
DISTRIBUTION: West Indies; also in South Africa and South America.

4. **Uredo Dioscoreae** P. Henn. Hedwigia **35**: 255. 1896.

II. Uredinia mostly hypophyllous, scattered or circinating on pale discolored spots in groups 2–3 mm. in diameter, roundish, small, 0.2–0.6 mm. across, early naked, pulverulent, yellow or light cinnamon-brown, ruptured epidermis evident; urediniospores globoid or obovoid, 16–24 by 23–31 μ; wall colorless or pale-yellow, 1–2 μ thick, moderately and strongly echinulate, the pores equatorial, obscure.

ON DIOSCOREACEAE:
Dioscorea polygonoides H. & B., Porto Rico.
Dioscorea sp., Cuba.
Rajania cordata L., Cuba; Porto Rico.
TYPE LOCALITY: Rio de Janerio, Brazil, on *Dioscorea grandiflora*.
DISTRIBUTION: West Indies; also in South America and Asia.

5. **Uredo nominata** Arth. Bull. Torrey Club **49**: 194. 1922.

II. Uredinia amphigenous, grouped upon discolored areas 5–10 mm. across, oblong or linear, 0.4–1.5 mm. long, somewhat tardily naked, pulverulent, light-brown, ruptured epidermis evident; urediniospores ellipsoid or obovoid, 18–23 by 23–32 μ; wall light cinnamon-brown, 1.5–2 μ thick, moderately echinulate, the pores 3 or 4, approximately equatorial.

ON IRIDACEAE:
Sisyrinchium bermudianum L., Bermuda.
TYPE LOCALITY: St. Davids, Bermuda, on *Sisyrinchium bermudianum*.
DISTRIBUTION: Known only from the type locality.

6. **Uredo Behnickiana** P. Henn. Hedwigia **44**: 169. Mr 1905.

Hemileia americana Massee, Gard. Chron. III. **38**: 153. Au 1905.
Uredo americana Arth. Mycologia **10**: 149. 1918.

II. Uredinia hypophyllous, evenly scattered over large, slightly discolored areas, minute, emerging through the stomata, yellowish, pulverulent; urediniospores globoid or broadly ellipsoid, 18–21 by 18–24 μ; wall colorless or light yellow, thin, 1–1.5 μ, noticeably echinulate with blunt echinulations, the pores obscure, probably equatorial; pedicels profusely branched.

ON ORCHIDACEAE:
Cattleya Dowiana Batem., imported into England from Costa Rica.
Epidendrum vitellinum Lindl., imported into New Jersey from Mexico
Oncidium Cavendishianum Batem., imported into England from Guatemala.
TYPE LOCALITY: In greenhouses of Kew gardens, England, on *Oncidium Cavendishianum* imported from Guatemala.
DISTRIBUTION: On cultivated plants in greenhouses of New Jersey; also in Europe; probably native of Central America and Mexico.
ILLUSTRATIONS: Gard. Chron. III. **38**: *f. 53;* Grove, Brit. Rust Fungi *f. 285*.

7. **Uredo Gynandrearum** Corda, Ic. Fung. **3**: 3. 1839.

II. Uredinia amphigenous, numerous, early scattered or sometimes confluent over large areas, roundish, 0.4–1 mm. in diameter, rather early naked, pulverulent, yellowish, ruptured epidermis evident; urediniospores broadly ellipsoid or obovoid, 15–21 by 20–26 μ; wall 1.5–2.5 μ thick, sparsely and noticeably echinulate, the pores obscure.

ON ORCHIDACEAE:
Habenaria maculosa Lindl., Cuba; Jamaica; Porto Rico.
Prescottia oligantha (Sw.) Lindl., Porto Rico.
TYPE LOCALITY: South America, on an unidentified orchid.
DISTRIBUTION: West Indies; also in South America.
ILLUSTRATION: Corda, Ic. Fung. **3**: *pl. 1, f. 9*.

8. **Uredo pustulata** P. Henn. Hedwigia Beibl. **35**: 129. 1899.

II. Uredinia amphigenous, scattered, round or oblong, 0.6–1.2 mm. across, tardily naked, yellowish, pulverulent, ruptured epidermis conspicuous; urediniospores obovoid or ellipsoid, 18–23 by 23–29 μ; wall colorless or pale-yellow, thick, 2–3 μ, strongly and sparsely echinulate, the pores obscure.

ON ORCHIDACEAE:
Stenorrhynchus lanceolatus (Aubl.) Griseb., Porto Rico.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Stenorrhynchus* sp.
DISTRIBUTION: Porto Rico; also in South America.

9. **Uredo Guacae** Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 583. 1913.

II. Uredinia hypophyllous, scattered or circinating in groups 3–10 mm. wide, sometimes confluent, round or oblong, bullate, large, 0.5–2 mm. across, tardily naked, orange- or light-

yellow, pulverulent, ruptured epidermis conspicuous; urediniospores obovoid or ellipsoid, 20–27 by 29–37 μ; wall colorless or light-yellow, thick, 2.5–3 μ, sparsely and conspicuously echinulate, the pores probably 2 or 3, equatorial, obscure.

ON ORCHIDACEAE:
Epidendrum difforme Jacq., Porto Rico.
Spathiger rigidus (Jacq.) Small (*Epidendrum rigidum* Jacq.), Porto Rico.
TYPE LOCALITY: Central Andes, near road to Guaca, Antioquia, Colombia, on *Epidendrum* sp.
DISTRIBUTION: Porto Rico; also in South America.

10. **Uredo nigropuncta** P. Henn. Hedwigia **35**: 254. 1896.

Uredo Cyrtopodii Sydow, Bull. Herb. Boiss. II. **1**: 77. 1901.

II. Uredinia hypophyllous, forming conspicuous irregular orange or blackish masses, round or oblong, 1–2 mm. across, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores obovoid or ellipsoid, 20–25 by 24–32 μ; wall brownish-yellow, thick, 2–3 μ, sparsely and coarsely verrucose-echinulate, the pores 3, equatorial.

ON ORCHIDACEAE:
Bletia patula Hook., Cuba; Porto Rico.
Bletia purpurea (Lam.) DC., Florida; Bahamas; Haïti.
TYPE LOCALITY: Rio Janeiro, Brazil, on "*Stanhopea* sp.," error for *Cyrtopodium punctatum*.
DISTRIBUTION: Southern Florida and the West Indies; also in South America.

11. **Uredo Piperis** P. Henn. Hedwigia Beibl. **38**: 70. 1899.

II. Uredinia amphigenous, numerous, scattered or circinating on discolored areas, round, 0.3–0.6 mm. across, rather tardily naked, somewhat pulverulent, dirty cinnamon-brown, ruptured epidermis conspicuous; urediniospores obovoid or ellipsoid, 16–21 by 21–26 μ; wall colorless, 1–1.5 μ thick, sparsely and prominently echinulate, the pores obscure.

ON PIPERACEAE:
Peperomia hernandifolia (Vahl) A. Dietr., Porto Rico.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Piper* sp.
DISTRIBUTION: West Indies; also in South America.

12. **Uredo rubescens** Arth. Mycologia **7**: 327. 1915.

II. Uredinia hypophyllous, irregularly grouped on indefinite pale spots, round, small, 0.2–0.4 mm. across, soon naked, as if by a central pore, ruptured epidermis scarcely noticeable; paraphyses peripheral, cylindric, hyphoid, incurved, scarcely rising above the spore-mass, the wall colorless, smooth; urediniospores ellipsoid, 18–24 by 24–32 μ; wall pale cinnamon-brown, 1–2 μ thick, rather closely and strongly echinulate, the pores obscure.

ON ARTOCARPACEAE:
Dorstenia Contrajerva L., Guatemala; Salvador; Porto Rico.
Dorstenia Houstoni L., Guatemala.
TYPE LOCALITY: Camuy, Porto Rico, on *Dorstenia Contrajerva*.
DISTRIBUTION: Porto Rico and Guatemala; also in South America.

13. **Uredo Artocarpi** Berk. & Br. Jour. Linn. Soc. **14**: 93. 1873.

Physopella (?) *Artocarpi* Arth. N. Am. Flora **7**: 103. 1907.

II. Uredinia hypophyllous, thickly scattered over wide areas, or somewhat gregarious, bullate, round, small, 0.1–0.2 mm. across, dehiscent by a central pore, overarching epidermis persistent; paraphyses colorless, delicate, hyphoid, at the sides of the sorus uniting to form a membrane with polygonal cells above; urediniospores ellipsoid or obovoid, 16–23 by 18–26 μ; wall colorless or pale-yellow, 1–1.5 μ thick, moderately and noticeably echinulate, the pores probably 2, approximately equatorial, obscure.

ON ARTOCARPACEAE:
Artocarpus Camansi Blanco, Porto Rico.
Artocarpus communis Forst., Porto Rico.
Artocarpus incisa L., Cuba.
Castilloa elastica Cerv., Cuba.
TYPE LOCALITY: Ceylon, on *Artocarpus Lakoocha*.
DISTRIBUTION: West Indies; also in India.

14. **Uredo Phorodendri** H. S. Jackson, Brookl. Bot. Gard. Mem. 1: 285. 1918.

II. Uredinia amphigenous, gregarious, not crowded, punctate, rounded or slightly elongate, 0.4–0.8 mm. across, tardily naked, somewhat pulverulent, bright-orange, dehiscent by an elongate or lacerate fissure of the epidermis, ruptured epidermis remaining firm and persistent; peridium membranous, at first hemispheric, remaining closely adherent to the ruptured epidermis, the cells colorless, isodiametric or somewhat rhomboidal, 14–19 μ across, the wall 1–1.5 μ thick, smooth; urediniospores ellipsoid or obovoid, 17–33 by 26–32 μ; wall colorless, 1.5–2.5 μ thick, very closely and minutely echinulate, the pores 10–12, scattered, very indistinct.

ON LORANTHACEAE:
Phoradendron longispicum Trel., California.
Phoradendron villosum Nutt., Oregon.
TYPE LOCALITY: Corvallis, Oregon, on *Phoradendron villosum*.
DISTRIBUTION: Western Oregon to northern California.

15. **Uredo Coccolobae** P. Henn. Hedwigia **35**: 253. 1896.

II. Uredinia mostly hypophyllous, numerous, scattered, minute, about 0.1–0.3 mm. across, punctiform, tardily naked, opening by a central pore, pulverulent, appearing as a rusty discoloration, ruptured epidermis conspicuous; paraphyses encircling the sorus imbricated into a pseudoperidium, clavate or sometimes capitate, 9–10 by 27–50 μ, the wall colorless, thickened up to 5 μ at apex, smooth; urediniospores ellipsoid, 21–24 by 29–37 μ; wall pale-yellow or colorless, 1–1.5 μ thick, frequently somewhat thickened at hilum, finely and closely echinulate, the pores about 4, scattered, obscure.

ON POLYGONACEAE:
Coccolobis Uvifera (L.) Jacq., Florida; Cuba; Porto Rico.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Coccolobis populifolia*.
DISTRIBUTION: Southern Florida and the West Indies; also in South America.
EXSICCATI: Barth. N. Am. Ured. *1980*.

16. **Uredo Grayiae** Arth. Bull. Torrey Club **34**: 591. 1907.

II. Uredinia amphigenous, scattered, sometimes confluent, roundish, 0.5–1 mm. across, soon naked, pulverulent, chocolate-brown, ruptured epidermis somewhat noticeable; urediniospores ellipsoid or obovate-ellipsoid, 19–23 by 32–42 μ; wall dark cinnamon-brown, somewhat lighter below, rather thick, 2–2.5 μ, slightly thicker above, 2.5–3.5 μ, moderately and noticeably echinulate above, smooth along the sides, the pores 8, in two transverse zones, equidistant from the equator.

ON CHENOPODIACEAE:
Grayia spinosa (Hook.) Moq. (*G. polygaloides* H. & A.), Nevada.
TYPE LOCALITY: Fallon, Nevada, on *Grayia spinosa*.
DISTRIBUTION: Known only from the type locality.

17. **Uredo Spirostachydis** Arth. Bull. Torrey Club **37**: 576. 1910.

II. Uredinia caulicolous, scattered or irregularly grouped, roundish, 0.4–0.8 mm. across, rather tardily naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid, 18–21 by 23–29 μ; wall cinnamon-brown, 2–2.5 μ thick, moderately and rather finely echinulate, the pores 6–8, scattered, somewhat obscure.

ON CHENOPODIACEAE:
Allenrolfea occidentalis (S. Wats.) Kuntze (*Spirostachys occidentalis* S. Wats.), Arizona.
TYPE LOCALITY: North Yuma, Arizona, on *Spirostachys occidentalis*.
DISTRIBUTION: Known only from the type locality.

18. **Uredo Cyathulae** Mayor, Mém. Soc. Neuch. Sci. Nat. 5: 584. 1913.

II. Uredinia hypophyllous, scattered or confluently circinating in groups 2–10 mm. wide on slightly discolored spots, round or oblong, 0.5–2 mm. across, early naked, compact becoming pulverulent, dark cinnamon- or chestnut-brown, ruptured epidermis conspicuous;

urediniospores broadly ellipsoid, 23–26 by 26–29 μ; wall light chestnut- or golden-brown, about 3 μ thick, sparsely and strongly echinulate, the pores usually 2 and approximately equatorial.

ON AMARANTHACEAE:
Cyathula achyranthoides (H.B.K.) Moq., Panama.
TYPE LOCALITY: Near Honda, Cundinamarca, Colombia, on *Cyathula achyranthoides*.
DISTRIBUTION: Panama; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. 5: *f. 89*.

19. **Uredo maculans** Pat. & Gaill. Bull. Soc. Myc. Fr. 4: 98. 1888.

II. Uredinia amphigenous, scattered or confluently circinating in groups 3–8 mm. wide on slightly discolored areas, round or oblong, 0.5–3 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis somewhat noticeable; urediniospores globoid or broadly-ellipsoid, 23–27 by 24–29 μ; wall cinnamon-brown, thick, 3–4 μ, very closely and finely verrucose, the pores 3 or 4, approximately equatorial.

ON AMARANTHACEAE:
Achyranthes Williamsii Standley, Panama.
Achyranthes sp., Costa Rica.
TYPE LOCALITY: Caracas, Venezuela, on *Amaranthaceae*.
DISTRIBUTION: Central America; also in South America.

20. **Uredo panamensis** Arth. Bull. Torrey Club 45: 155. 1918.

II. Uredinia hypophyllous, rarely epiphyllous, crowded and often confluent in circular groups, round or oval, 0.2–0.8 mm. across, early naked, pulvinate, cinnamon-brown, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 20–27 by 24–31 μ; wall cinnamon-brown, thick, 2–3 μ, very closely and finely echinulate, the pores distinct, 3, approximately equatorial.

ON PETIVERIACEAE:
Phytolacca decandra L., Panama.
TYPE LOCALITY: Panama, on *Phytolacca decandra*.
DISTRIBUTION: Known only from the type locality.

21. **Uredo Paronychiae** H. S. Jackson, sp. nov.

II. Uredinia hypophyllous, solitary, one to few on discolored spots 1–2 mm. across, round, small, 0.2–0.5 mm. in diameter, tardily naked, yellowish-brown, pulverulent, ruptured epidermis conspicuous; urediniospores broadly ellipsoid or globoid, 20–23 by 23–26 μ; wall light golden-brown, 2–2.5 μ thick, closely and evenly verrucose-echinulate, the pores indistinct, 4 to 6, scattered.

ON CORRIGIOLACEAE:
Paronychia chilensis DC., California.
Type collected at Lands End, San Francisco, California, on *Paronychia chilensis*, October 15, 1921, *W. C. Blasdale 1156*.

22. **Uredo Cherimoliae** Lagerh. Bull. Soc. Myc. Fr. 11: 215. 1895.

Uredo cupulata Ellis & Ev. Field Mus. Publ. Bot. 2: 16. 1900.
Physopella Cherimoliae Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.

II. Uredinia hypophyllous, numerous, scattered or somewhat aggregated into irregular groups, small, 0.1–0.4 mm. in diameter, early naked, pulverulent, pale-brownish, ruptured epidermis evident; paraphyses surrounding the sorus, somewhat imbricated to form a pseudoperidium, clavate, contracted near apex, 10–13 μ wide by 40–50 μ long, the wall colorless, about 1 μ thick below, thickened above so as to obliterate the lumen; urediniospores obovoid, 16–19 by 26–31 μ; wall pale-yellow, thin, about 1 μ, finely and rather closely echinulate, the pores obscure.

ON ANNONACEAE:
Annona Cherimolia Mill., Florida.
Annona muricata L., Cuba.

Annona reticulata L., Cuba.
Annona squamosa L., Florida; Cuba.
Annona squamosa × *Cherimolia*, Florida.
Annona sp., Yucatan.
TYPE LOCALITY: Ecuador, on *Annona Cherimolia*.
DISTRIBUTION: Southern Florida; western Cuba and northeastern Yucatan; also in South America.

23. **Uredo Licaniae** P. Henn. Hedwigia **34**: 99. 1895.

II. Uredinia amphigenous, scattered or indefinitely grouped, round, prominent, 0.2–0.8 mm. in diameter, early naked, pulvinate, lemon-yellow, somewhat pulverulent, ruptured epidermis inconspicuous; paraphyses none; urediniospores obovate-globoid or obovate, 14–20 by 17–26 μ; wall pale-yellow or colorless, 1.5 μ thick, appearing thicker, evenly verrucose-echinulate, the pores obscure, apparently equatorial.

ON AMYGDALACEAE:
Couepia polyandra (H.B.K.) Rose, Salvador.
TYPE LOCALITY: Goyaz near Meiaponte, Brazil, on *Licania* sp.
DISTRIBUTION: Southern Salvador; also in South America.

24. **Uredo curvata** Arth. Bull. Torrey Club **49**: 195. 1922.

II. Uredinia hypophyllous, loosely grouped on slightly discolored areas 3–5 mm. across, round, small, 0.1–0.3 mm. in diameter, soon naked, pulverulent, dark chestnut-brown, ruptured epidermis inconspicuous; paraphyses numerous, peripheral, incurved, hyphoid or somewhat clavate, slender, about 7 by 30 μ, colorless below, light chestnut-brown above, sometimes one- or two-septate; urediniospores obovate, 14–16 by 26–32 μ, very strongly incurved; wall chestnut-brown, uniformly thin, 1 μ, with one indistinct pore on the concave side below the equator, evenly echinulate-verrucose.

ON MIMOSACEAE:
Inga vera Willd., Cuba.
TYPE LOCALITY: San Diego de los Baños, Cuba, on *Inga vera*.
DISTRIBUTION: Known only from the type locality.

25. **Uredo Hymenaeae** Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 585. 1913.

II. Uredinia hypophyllous, numerous, scattered or loosely grouped on brownish spots, round, 0.3–0.7 mm. across, opening by an irregular central break in the overarching epidermis, pulverulent, dark cinnamon-brown; paraphyses none; urediniospores obovoid or ellipsoid, 13–17 by 26–39 μ; wall golden- or cinnamon-brown, thin, 1 μ, thicker at the apex, 2–4 μ, moderately echinulate, the pores 2, superequatorial.

ON CAESALPINIACEAE:
Hymenaea Courbaril L., Cuba; Porto Rico.
TYPE LOCALITY: Central Andes, between Sabaletas and Titiribi, Antioquia, Colombia, on *Hymenaea* sp.
DISTRIBUTION: West Indies; also in South America.

26. **Uredo lutea** Arth. Mycologia **7**: 321. 1915.

II. Uredinia hypophyllous, abundantly scattered or in small groups on discolored spots, pustular, 0.3–0.7 mm. across, long covered by the brown overarching epidermis, finally sparingly pulverulent; paraphyses none; urediniospores irregularly ellipsoid or obovoid, 19–21 by 26–29 μ; wall cinnamon-brown, about 1.5 μ thick, moderately echinulate, the pores usually indistinct, 2 or rarely 3, equatorial.

ON CAESALPINIACEAE:
Chamaefistula antillana Britt. & Rose, Porto Rico.
TYPE LOCALITY: Porto Rico, on "*Cassia quinquangulata*," error for *Chamaefistula antillana*.
DISTRIBUTION: Porto Rico.

27. **Uredo bauhiniicola** P. Henn. Hedwigia **34**: 98. 1895.

II. Uredinia hypophyllous, scattered or sometimes circinating in groups 2–3 mm. wide and confluent, on dark-brown circular spots, roundish, 0.2–0.7 mm. across, rather tardily naked, pulverulent, yellowish or dirty-gray, ruptured epidermis evident; urediniospores ellipsoid or obovoid, 15–18 by 19–26 μ; wall colorless or light-yellow, 1.5–2.5 μ thick, moderately and noticeably echinulate, the pores obscure, probably equatorial.

ON CAESALPINIACEAE:
Bauhinia heterophylla Kunth, Cuba.
TYPE LOCALITY: Goyaz, Brazil, on *Bauhinia rubiginosa*.
DISTRIBUTION: Cuba; also in South America.
EXSICCATI: Barth. N. Am. Ured. *2183*.

28. **Uredo unilateralis** Arth. Bull. Torrey Club **45**: 155. 1918.

II. Uredinia hypophyllous, in groups 2–4 mm. across, more or less circinating, or scattered, round, 0.2–0.8 mm. in diameter, soon naked, cinnamon–brown, somewhat pulverulent, ruptured epidermis evident; urediniospores broadly obovoid or spatulate-obovoid, flattened or concave on one side, 20–26 by 26–32 μ; wall cinnamon–brown, 1–2 μ thick, sparsely and noticeably echinulate except on concave side which is smooth, with one pore on concave side, subequatorial, sometimes near the hilum.

ON GERANIACEAE:
Geranium mexicanum H.B.K., Mexico (state).
TYPE LOCALITY: Amecameca, Mexico, on *Geranium mexicanum*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *2481*.

29. **Uredo Erythroxylonis** Graz. Bull. Soc. Myc. Fr. **7**: 152. 1891.

II. Uredinia hypophyllous, numerous, scattered, small, 0.2–0.5 mm. across, roundish, cinnamon-brown, tardily erumpent, ruptured epidermis conspicuous; urediniospores angularly ellipsoid, obovoid, or pyriform, 17–23 by 21–30 μ; wall cinnamon-brown above, much paler below, uniformly thin, 1 μ, sparsely echinulate above becoming smooth toward the base, the pores 2 or 3, approximately equatorial or scattered.

ON ERYTHROXYLACEAE:
Erythroxylon areolatum L., Mona Island.
Erythroxylon brevipes DC., Porto Rico.
Erythroxylon havanense Jacq., Cuba.
TYPE LOCALITY: Bolivia, on *Erythroxylon Coca*.
DISTRIBUTION: West Indies; also in South America.
EXSICCATI: Barth. Fungi Columb. *2287*.

30. **Uredo Trichiliae** Arth. Mycologia **9**: 90. 1917.

II. Uredinia caulicolous or hypophyllous, on etiolated shoots and on midrib and veins, oblong or linear, 0.5–3.5 mm. long, numerous, soon naked, pulverulent, bright-yellow, ruptured epidermis evident; peridium and paraphyses none; urediniospores obovoid or ellipsoid, small, 13–15 by 16–23 μ; wall colorless or nearly so, thin 1–1.5 μ, closely and finely echinulate, the pores obscure.

ON MELIACEAE:
Trichilia pallida Sw., Porto Rico.
TYPE LOCALITY: Maricao along Rio Grande, Porto Rico, on *Trichilia pallida*.
DISTRIBUTION: Porto Rico; also in South America.

31. **Uredo peribebuyensis** Speg. Anal. Soc. Ci. Argent. **17**: 123. 1884.

II. Uredinia caulicolous and hypophyllous, irregularly grouped or sometimes confluent, on light discolored areas, roundish, 0.4–1 mm. across, rather tardily naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; paraphyses none; urediniospores ellipsoid or obovoid, 19–23 by 24–34 μ; wall golden-brown, variable in thickness, 1–2.5 μ, closely echinulate, the pores 2–4, equatorial, evident.

ON POLYGALACEAE:
Polygala americana Mill., Guatemala.
Polygala Watsoni Chod. (*P. acicularis* S. Wats.), Chihuahua.
TYPE LOCALITY: Cordillera de Peribebuy, Paraguay, on *Monninia* sp.
DISTRIBUTION: Northern Mexico to Guatemala; also in South America.

32. **Uredo Saviae** Arth. & Johnston, Mem. Torrey Club 17: 168. 1918.

II. Uredinia hypophyllous, scattered, oval or oblong, 0.1–0.3 mm. long, rather early naked, cinnamon-brown, ruptured epidermis usually overarching and conspicuous; urediniospores angularly pyriform or obovoid, 16–21 by 23–29 μ; wall cinnamon-brown, about 1 μ thick, closely echinulate, the pores 3, approximately equatorial, in the angles of the spore.

ON EUPHORBIACEAE:
Savia sessiliflora (Sw.) Willd., Cuba.
TYPE LOCALITY: San Juan, Isle of Pines, on *Savia sessiliflora*.
DISTRIBUTION: Known only from the type locality.

33. **Uredo jatrophicola** Arth. Mycologia 7: 331. 1915.

II. Uredinia mostly hypophyllous, crowded or confluent on slightly discolored spots or evenly scattered, bullate-conic, small, 0.1–0.3 mm. in diameter, long covered by the overarching epidermis, opening by a central pore that gradually enlarges; peridium paraphysoid, the paraphyses clavate or capitate with the slender stalks firmly united into an enveloping wall imbricately projecting into the cavity of the sorus, 9–12 μ broad, the wall about 1 μ thick and colorless below, 3–7 μ, and colorless or tinted above, smooth; urediniospores ellipsoid or obovoid-ellipsoid, 16–20 by 24–29 μ; wall very pale-yellow or colorless, thin, 1–1.5 μ, moderately and rather finely echinulate, the pores obscure.

ON EUPHORBIACEAE:
Adenoropium angustifolium (Griseb.) Arth. (*Jatropha angustifolia* Griseb.), Cuba.
Adenoropium gossypiifolium (L.) Pohl (*Jatropha gossypiifolia* L.), Cuba; Porto Rico; St. Croix; Santo Domingo.
Curcas Curcas (L.) Britt. & Millsp. (*Jatropha Curcas* L.), Cuba; Porto Rico; Santo Domingo.
TYPE LOCALITY: Hormigueros, Porto Rico, on *Jatropha Curcas*.
DISTRIBUTION: West Indies.

34. **Uredo Sauvagesiae** Arth. Mycologia 8: 23. 1916.

II. Uredinia hypophyllous, grouped on blackish-purple spots, 1–3 mm. across, round, small, 0.1 mm. in diameter, ruptured epidermis prominent, dark cinnamon-brown; urediniospores ellipsoid or obovoid, 17–20 by 24–27 μ; wall cinnamon-brown, thin, 1–1.5 μ, closely and finely echinulate, the pores probably 2, equatorial, indistinct.

ON OCHNACEAE:
Sauvagesia erecta L., Porto Rico.
TYPE LOCALITY: Jejome Alto, Porto Rico, on *Sauvagesia erecta*.
DISTRIBUTION: Porto Rico.

35. **Uredo Clusiae** Arth. Mycologia 9: 91. 1917.

II. Uredinia hypophyllous, scattered, mammilliform, 0.3–0.6 mm. across, dark-brown, opening by a central pore or rupture, deep-seated; urediniospores obovoid or ellipsoid, 19–23 by 28–35 μ; wall light-yellow, about 1.5 μ thick, sparsely and strongly echinulate. the markings 1–2 μ long and 3 μ apart, the pores obscure.

ON CLUSIACEAE:
Clusia rosea Jacq., Porto Rico.
TYPE LOCALITY: Maricao, mountains along Rio Grande, Porto Rico, on *Clusia rosea*.
DISTRIBUTION: Known only from the type locality.

36. **Uredo Bixae** Arth. Mycologia 7: 327. 1915.

II. Uredinia amphigenous, numerous, scattered singly in groups of two to four on small purple spots, very small, about 0.1 mm. across, soon naked, ruptured epidermis inconspicuous;

paraphyses peripheral showing as a whitish circle, rising but little above the surface of the leaf, numerous, incurved, clavate-cylindric, 9–10 by 27–35 μ, the walls colorless, smooth, the inner thin, 1 μ, the outer thicker, 2–5 μ; urediniospores obovoid, 16–23 by 26–37 μ; wall nearly colorless, thin, 1 μ or less, closely and finely echinulate, the pores obscure.

ON BIXACEAE:
Bixa Orellana L., Porto Rico.
TYPE LOCALITY: Adjuntas, Porto Rico, on *Bixa Orellana*.
DISTRIBUTION: Porto Rico.

37. **Uredo recondita** Speg. Bol. Acad. Ci. Cordoba **23**: 186. 1919.

II. Uredinia hypophyllous, scattered, round or oblong, 0.2–0.5 mm. long, tardily naked, opening by irregular splitting of the epidermis, somewhat pulverulent, cinnamon-brown, ruptured epidermis conspicuous; peridium and paraphyses none; urediniospores ellipsoid or oblong, 13–18 by 19–29 μ; wall cinnamon-brown, thin, 1 μ, moderately and conspicuously echinulate, the pores inconspicuous, probably 3 or 4, scattered.

ON FLACOURTIACEAE:
Myroxylon Salzmanni (Clos) Kuntze (*Xylosma Salzmanni* Eichl.), Costa Rica.
TYPE LOCALITY: Carthago, Costa Rica, on *Xylosma Salzmanni*.
DISTRIBUTION: Known only from the type locality.

38. **Uredo floridana** Sydow, Hedwigia Beibl. **40**: 129. 1901.

II. Uredinia hypophyllous, in indefinite groups, small, round, soon naked, pulverulent, orange-yellow; peridium and paraphyses none; urediniospores ellipsoid or obovoid, 14–20 by 20–30 μ; wall pale-yellow, thin, 1.5–2 μ, rather sparsely echinulate with blunt conic warts, the pores equatorial, obscure.

ON LOASACEAE:
Mentzelia cordata Kellogg, Lower California.
Mentzelia floridana Nutt., Florida.
TYPE LOCALITY: Florida on *Mentzelia floridana*.
DISTRIBUTION: Southern Florida and Lower California.

39. **Uredo Cupheae** P. Henn. Hedwigia **34**: 99. 1895.

II. Uredinia amphigenous, scattered or loosely grouped, roundish, 0.3–0.7 mm. in diameter, dark cinnamon-brown, rather early naked, pulverulent, ruptured epidermis conspicuous; paraphyses none; urediniospores ellipsoid or obovoid, 15–19 by 21–28 μ; wall light cinnamon-brown, often paler below, thin, 1 μ, moderately echinulate, the pores 2 or 3, equatorial, indistinct.

ON LYTHRACEAE:
Ginoria americana Jacq., Cuba.
Parsonsia Parsonsia (L.) Britton (*Cuphea Parsonsia* R. Br.), Jamaica; Porto Rico.
TYPE LOCALITY: Goyaz, Brazil, on *Cuphea* [*micrantha*].
DISTRIBUTION: West Indies; also in South America.

40. **Uredo Fuchsiae** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 538. 1918.

II. Uredinia hypophyllous, in small irregular groups 0.5–3 mm. across, round, 0.1–0.2 mm. in diameter, long covered by the epidermis, pulverulent, pale-yellow, ruptured epidermis evident; peridium hemispheric, delicate, opening at first by a small pore, later more or less uncovered, the peridial cells rectangular or rhombic, abutted, the walls colorless, thin, 1 μ, smooth; urediniospores ellipsoid, 13–16 by 18–24 μ; wall colorless, moderately thick, 1–2 μ, moderately and rather inconspicuously echinulate, the pores obscure.

ON ONAGRACEAE:
Fuchsia splendens Zucc., Guatemala.
Lopezia hirsuta Jacq., Costa Rica; Guatemala.
TYPE LOCALITY: Volcan de Agua, Antigua, Guatemala, on *Fuchsia splendens*.
DISTRIBUTION: Central America.

41. **Uredo Lucumae** Arth. & Johnston, Mem. Torrey Club 17: 169. 1918.

O. Pycnia amphigenous, numerous, on spots with the uredinia, subcuticular, brownish, flattish, 80–100 μ in diameter by 40–60 μ in height; ostiolar filaments wanting.

II. Uredinia amphigenous, sometimes only hypophyllous, in groups 1–15 mm. across on dark spots, roundish, 0.1–0.3 mm. in diameter, early naked, pulverulent, light chestnut-brown, surrounded and partly covered by the hypertrophied tissues; urediniospores globoid or broadly ellipsoid, 29–35 by 35–42 μ, larger when wet through the swelling of an outer gelatinous covering; wall of two layers, the inner golden- or cinnamon-brown, 2–3 μ thick, the outer pale, 2–6 μ thick in water, bearing coarse conic tubercles, the pores 2 or more, scattered or sometimes equatorial, indistinct.

ON SAPOTACEAE:
Lucuma nervosa A. DC., Cuba.
TYPE LOCALITY: Santiago de las Vegas, Cuba, on *Lucuma nervosa*.
DISTRIBUTION: Cuba.

42. **Uredo Sapotae** Arth. & Johnston, Mem. Torrey Club 17: 169. 1918.

II. Uredinia hypophyllous, scattered or gregarious in close groups of a few each on small discolored areas 0.5–1 mm. in diameter, oval, 0.1–0.3 mm. long, rather tardily naked, cinnamon-brown, pulverulent, opening by a lateral rupture of the epidermis which remains as an evident flap; urediniospores with pores in surface view appearing triangular, with pores in optical section broadly obovoid, 18–22 by 21–26 μ; wall cinnamon-brown, moderately thick, 1.5–2 μ, closely echinulate, the pores 2, opposite, close to the hilum.

ON SAPOTACEAE:
Sapota Achras Mill. (*Achras Sapota* L.), Bahamas; Bermuda; Cuba.
TYPE LOCALITY: Santiago de las Vegas, Cuba, on *Achras Sapota*.
DISTRIBUTION: Islands from Bermuda to Cuba.
EXSICCATI: Barth. N. Am. Ured. *2184*.

43. **Uredo amicosa** Arth. Bull. Torrey Club 46: 121. 1919.

II. Uredinia hypophyllous, scattered, bullate, 0.2–0.4 mm. in diameter, opening by a central pore; paraphyses thickly imbricated, the united bases forming a tissue-like lining to the sides of the sorus, the long free ends cylindric or fusiform-cylindric, 10–16 by 67–112 μ, acuminate or acute, the wall colorless, thickened to nearly or quite obliterate the lumen; urediniospores pedicellate, angularly oblong, ellipsoid, or obovoid, 23–24 by 40–60 μ; wall golden-brown, 2–3 μ thick, sometimes twice as thick at apex, sparsely and strongly echinulate, the pores obscure, possibly 3 or 4 and equatorial.

ON SAPOTACEAE:
Chrysophyllum Cainito L., Porto Rico.
TYPE LOCALITY: Mesas near Mayagüez, Porto Rico, on *Chrysophyllum Cainito*.
DISTRIBUTION: Known only from the type locality.

44. **Uredo laeticolor** Arth. Bull. Torrey Club 47: 473. 1920.

Uredo Operculinae Arth. Mycologia 9: 95. 1917. Not *U. Operculinae* Sydow, 1913.

II. Uredinia hypophyllous, in small crowded groups on slightly discolored spots, or scattered singly, bullate, small, light cinnamon-brown, opening by a small rupture of the overarching epidermis; peridium and paraphyses none; urediniospores obovoid or oblong-obovoid, 14–23 by 23–29 μ; wall pale-brownish or nearly colorless, thin, about 1 μ, finely and closely echinulate, the pores obscure.

ON CONVOLVULACEAE:
Operculina dissecta (Jacq.) House (*Impomoea dissecta* Pursh), Cuba; Porto Rico.
TYPE LOCALITY: Yauco, along railroad east, Porto Rico, on *Operculina dissecta*.
DISTRIBUTION: West Indies.

45. **Uredo contraria** Arth. Bull. Torrey Club **47**: 472. 1920.

II. Uredinia hypophyllous, scattered, round, minute, 0.1–0.3 mm. in diameter, early naked, yellow, very pulverulent, ruptured epidermis inconspicuous; urediniospores oblong or obovate-oblong, 20–24 by 27–35 μ; wall colorless, 1.5–2 μ thick, finely and rather sparsely echinulate, the pores obscure.

ON HYDROPHYLLACEAE:
Phacelia californica Cham., California.
Phacelia tanacetifolia Benth., California.
TYPE LOCALITY: Carmel, California, on *Phacelia tanacetifolia*.
DISTRIBUTION: Coast of central California in vicinity of the type locality.

46. **Uredo sphacelicola** Dietel & Holway; Dietel, Erythea **1**: 248. 1893.

II. Uredinia amphigenous, scattered or circinating on pale discolored spots, round, 0.4–2 mm. in diameter, early naked, cinnamon-brown, pulverulent or sometimes appearing pulvinate, ruptured epidermis evident; urediniospores oblate-spheroid or sometimes ellipsoid, 26–31 by 23–34 μ; wall dark cinnamon-brown, 1–1.5 μ thick, sometimes thickened above to 2.5 μ, moderately echinulate, markings sometimes more conspicuous above, the pores 2, opposite or nearly so, basal.

ON LAMIACEAE:
Sphacele calycina Benth., California.
TYPE LOCALITY: Mt. Tamalpais, California, on *Sphacele calycina*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *584;* Ellis & Ev. Fungi Columb. *560, 766;* Ellis & Ev. N. Am. Fungi *3149, 3249*.

47. **Uredo degener** (Mains & Holway) Arthur.

Puccinia (?) *degener* Mains & Holway; Arth. Am. Jour. Bot. **5**: 482. 1918.

II. Uredinia hypophyllous, scattered or crowded in small groups, round, 0.1–0.3 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores broadly obovoid, globoid or flattened-globoid, 19–23 by 19–25 μ; wall light cinnamon-brown, thin, 1–1.5 μ, moderately and rather prominently echinulate, with one pore, subequatorial, usually 5–7 μ from the hilum.

ON LAMIACEAE:
Salvia albiflora Mart. & Gal. (?), Guatemala.
TYPE LOCALITY: Road from Quezaltenango to Colomba, Guatemala, on *Salvia albiflora* (?).
DISTRIBUTION: Known only from the type locality.

48. **Uredo biporula** Arth. Bull. Torrey Club **46**: 121. 1919.

II. Uredinia hypophyllous, scattered or somewhat crowded, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis inconspicuous; urediniospores triangular-obovoid, 21–23 by 23–26 μ; wall dark cinnamon-brown, 1–2 μ thick, moderately echinulate, the pores 2, basal on opposite sides of the hilum.

ON LAMIACEAE:
Salvia fulgens Cav., Mexico (state).
TYPE LOCALITY: Amecameca, Mexico, on *Salvia fulgens*.
DISTRIBUTION: Known only from the type locality.

49. **Uredo Nicotianae** Arth.; Blasdale, Univ. Calif. Publ. Bot. **7**: 141. 1919.

II. Uredinia mostly hypophyllous, scattered upon discolored areas 1–1.5 cm. across, round, 0.2–0.5 mm. in diameter, early naked, applanate, pulverulent, pale-cinnamon to whitish, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 23–26 by 24–32 μ; wall colorless, 1.5–3 μ thick, closely and coarsely verrucose, the pores obscure.

ON SOLANACEAE:
Nicotiana Bigelovii S. Wats., California.
TYPE LOCALITY: Rionido, California, on *Nicotiana Bigelovii*.
DISTRIBUTION: Known only from the type locality.

50. **Uredo cumula** Arth. Bull. Torrey Club **49**: 195. 1922.

II. Uredinia amphigenous, somewhat aggregate or scattered, round, applanate, small, 0.1–0.4 mm. across, soon naked, pulverulent, cinnamon-brown, conspicuous, ruptured epidermis noticeable; urediniospores broadly ellipsoid or obovate, small, 18–20 by 22–25 μ; wall pale cinnamon-brown, thin, 1 μ or less, finely echinulate, the pores 2, equatorial, indistinct.

ON SCROPHULARIACEAE:
Buchnera elongata Sw., Cuba.
TYPE LOCALITY: Herradura, Cuba, on *Buchnera elongata*.
DISTRIBUTION: Known only from the type locality.

51. **Uredo sabiceicola** Arth. Mycologia **7**: 323. 1915.

II. Uredinia hypophyllous, scattered singly in groups of 2–5 on small discolored spots 0.5–1 mm. across, round, small, 0.1–0.3 mm. in diameter, dull cinnamon-brown; paraphyses peripheral, numerous, incurved, clavate, stout, 10–12 by 19–25 μ, the wall colorless, thin, 0.5 μ, somewhat thickened on the outer convex part, 1.5–2 μ, smooth; urediniospores obovoid, 16–23 by 25–29 μ; wall golden-yellow, thin, 1 μ, moderately verrucose-echinulate, the pores obscure.

ON RUBIACEAE:
Sabicea hirsuta H.B.K., Porto Rico.
TYPE LOCALITY: Mayagüez, Porto Rico, on "*Sabicea aspera*," error for *S. hirsuta*.
DISTRIBUTION: Porto Rico; also in South America.

52. **Uredo Hameliae** Arth. Mycologia **8**: 23. 1916.

II. Uredinia amphigenous, loosely grouped on indefinite, slightly paler spots, 1–1.5 cm. across, applanate, round, 0.2–0.6 mm. in diameter, pale cinnamon-brown; urediniospores globoid or obovoid, 15–21 by 19–24 μ; wall pale-yellow, thin, 1 μ, distinctly and moderately echinulate, the pores possibly 2 and equatorial, obscure.

ON RUBIACEAE:
Hamelia erecta Jacq. (*H. patens* Jacq.), Costa Rica; Porto Rico.
TYPE LOCALITY: Lajos, Porto Rico, on *Hamelia patens*.
DISTRIBUTION: Porto Rico and Central America.

53. **Uredo Rondeletiae** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 539. 1918.

II. Uredinia hypophyllous, scattered, round, 0.1–0.4 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; peridium and paraphyses none; urediniospores obovoid-reniform, 13–21 by 23–29 μ; wall cinnamon-brown, thin, 1 μ, closely echinulate, the pores obscure.

ON RUBIACEAE:
Rondeletia cordata Benth., Guatemala.
TYPE LOCALITY: Guatemala City, Guatemala, on *Rondeletia cordata*.
DISTRIBUTION: Known only from the type locality.

54. **Uredo Cephalanthi** Arth. Bull. Torrey Club **29**: 231. 1902.

II. Uredinia mostly hypophyllous, diffusely scattered, irregularly bullate, small, 0.1–0.4 mm. across, rather early naked, pulverulent, pale-yellowish, ruptured epidermis evident; urediniospores ellipsoid or obovoid, 15–20 by 19–26 μ; wall very light cinnamon-brown, thin, 1–1.5 μ, closely echinulate, the pores probably 4, equatorial, obscure.

ON RUBIACEAE:
Cephalanthus occidentalis L., Florida; Cuba.
TYPE LOCALITY: Palmetto, Florida, on *Cephalanthus occidentalis*.
DISTRIBUTION: Southern Florida and Cuba.

55. **Uredo Reicheana** Arthur, sp. nov.

II. Uredinia amphigenous, chiefly hypophyllous, occurring singly or gregarious in groups of 2–4 on angular, yellowish areas 1–4 mm. across, round, rather large, 0.5–0.8 mm. in diameter,

early naked, pulverulent, cinnamon-brown, ruptured epidermis usually noticeable; urediniospores depressed-globoid, 18–22 μ high by 24–28 μ wide; wall light cinnamon-brown, 1.5–2 μ thick, moderately and strongly echinulate, the pores 4–5 around hilum, and one or two in upper part.

ON VALERIANACEAE:
Valeriana subincisa Benth., Mexico (state).
Type collected in Federal District, Mexico, February, 1922, *K. Reiche*, communicated by P. Dietel, February, 1924.

56. **Uredo Sparganophori** P. Henn. Hedwigia **43**: 160. 1904.

II. Uredinia amphigenous, scattered singly or in irregular, sometimes circinating groups on brownish discolored spots, bullate, round or oblong, 0.2–0.6 mm. across, rather tardily naked, pulverulent, light yellowish-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 18–23 by 24–31 μ; wall colorless, thin, 1–1.5 μ, moderately or sparsely and strongly echinulate, the pores probably 2, equatorial, obscure.

ON CARDUACEAE:
Struchium Sparganophorum (L.) Kuntze (*Sparganophorum Vailantii* Gaert.), Cuba; Jamaica; Porto Rico.
TYPE LOCALITY: Rio Juruá, Santa Clara, Brazil, on *Sparganophorum Vailantii*.
DISTRIBUTION: West Indies; also in South America.

57. **Uredo suspecta** Jackson & Holway; Arth. Mycologia **10**: 150. 1918.

II. Uredinia hypophyllous, few, gregarious, scattered or frequently confluent, roundish, 0.2–0.5 mm. across, tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 26–29 by 30–35 μ; wall dark cinnamon-brown, 2–2.5 μ thick, moderately and prominently echinulate, the pores 2, distinct, opposite and approximately equatorial.

ON CARDUACEAE:
Eupatorium daleoides (DC.) Hemsl.?, Costa Rica.
TYPE LOCALITY: Cartago, Costa Rica, on *Eupatorium daleoides*.
DISTRIBUTION: Known only from the type locality.

58. **Uredo vicina** Arth. Mycologia **7**: 325. 1915.

II. Uredinia hypophyllous, scattered, round, 0.3–0.5 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis evident; urediniospores globoid, often flattened above, 24–29 μ in diameter; wall chestnut-brown, 1.5–2 μ thick, closely echinulate, the pores 3 or 4, equatorial.

ON CARDUACEAE:
Wedelia lanceolata DC., Porto Rico.
TYPE LOCALITY: Guanica, Porto Rico, on *Wedelia lanceolata*.
DISTRIBUTION: Porto Rico; also in South America.

59. **Uredo Garcilassae** P. Henn. Hedwigia **43**: 160. 1904.

II. Uredinia hypophyllous, scattered, round, small, 0.2–0.5 mm. across, somewhat tardily naked, pulverulent, cinnamon-brown, becoming bare and whitish through scattering of spores, ruptured epidermis not conspicuous; urediniospores broadly ellipsoid or obovate, small, 16–18 by 18–22 μ; wall light cinnamon-brown, thin, 1–1.5 μ, closely and very finely echinulate, the pores 2, approximately opposite and considerably subequatorial.

ON CARDUACEAE:
Garcillassa rivularis Poepp. & Endl., Panama.
TYPE LOCALITY: Terapoto, Peru, on *Garcilassa rivularis*.
DISTRIBUTION: Panama; also in South America.

60. **Uredo Wilsoni** Arth. Bull. Torrey Club **37**: 577. 1910.

II. Uredinia hypophyllous, scattered, punctiform, 0.1–0.3 mm. across, soon naked, pulverulent, chestnut-brown, ruptured epidermis inconspicuous; paraphyses abundant, peripheral,

cylindric, septate, the walls smooth, colored; urediniospores globoid or broadly ellipsoid, 21–25 by 26–29 μ; wall light chestnut-brown, rather thick, 2–2.5 μ, strongly and closely echinulate with conic, blunt warts, the pores 2, equatorial and opposite.

ON CARDUACEAE:
Anastraphia bahamensis Urban, Bahamas.
TYPE LOCALITY: Hanna Hill, Long Cay, Bahamas, on *Anastraphia bahamensis*.
DISTRIBUTION: Known only from the type locality.

EXCLUDED SPECIES

UREDO AECIDIOIDES Peck, Ann. Rep. N. Y. State Mus. **24**: 88. 1872. (*Uredo Peckii* Thüm. Myc. Univ. *538*. 1877). On *Amphicarpa monoica* Ell. (*Falcata comosa* Kuntze), New York. This is *Synchytrium decipiens* Farl.

UREDO CALIFORNICA Ellis & Ev. Erythea **1**: 205. 1893. On *Vicia gigantea* Hook., Mill Valley, California. This does not belong to the Uredinales; may be a *Gloeosporium*.

4. AECIDIUM.

Sori on angiospermous hosts (usually aecia, or in a few cases telia), definite, subepidermal, erumpent, the spore-mass usually surrounded by a peridium; peridium one cell in thickness, cupulate, urceolate or cylindric, firm or evanescent, opening at the apex, the margin becoming erect or revolute, erose or lacerate, the peridial cells abutted or overlapping, usually smooth without and verrucose within; aeciospores catenulate, one-celled, usually globoid, or not much longer than broad; wall colorless, or occasionally colored, verrucose, the pores rarely visible.

Pycnia when present subepidermal, definite, with protruding ostiolar filaments, or occasionally subcuticular, and then without ostiolar filaments.

Genus based upon a concept, and not upon a type species.

Host belonging to family Liliaceae.	1. *A. anthericicola.*
Host belonging to family Dracaenaceae.	2. *A. Yuccae.*
Host belonging to family Trilliaceae.	3. *A. Trillii.*
Host belonging to family Amaryllidaceae.	
Aeciospores rather small, 16–20 x 20–27 μ.	4. *A. Zephyranthis.*
Aeciospores large, 23–26 x 27–32 μ.	5. *A. modestum.*
Host belonging to family Iridaceae.	6. *A. residuum.*
Host belonging to family Orchidaceae.	7. *A. Graebnerianum.*
Host belonging to family Urticaceae.	
Aeciospores very small, 10–13 x 13–16 μ.	8. *A. Boehmeriae.*
Aeciospores larger, 17–19 x 18–23 μ.	9. *A. libertum.*
Host belonging to family Loranthaceae.	10. *A. Loranthi.*
Host belonging to family Allioniaceae.	
Aeciospores small, 15–16 x 16–23 μ, the wall 1 μ.	11. *A. Pisoniae.*
Aeciospores larger, 16–19 x 21–28 μ, the wall 1–1.5 μ.	12. *A. Mirabilis.*
Host belonging to family Ranunculaceae.	13. *A. indecisum.*
Host belonging to family Berberidaceae.	14. *A. Butlerianum.*
Host belonging to family Papaveraceae.	15. *A. plenum.*
Host belonging to family Saxifragaceae.	16. *A. Mitellae.*
Host belonging to family Caesalpiniaceae.	17. *A. Chamaecristae.*
Host belonging to family Fabaceae.	18. *A. Onobrychidis.*
Host belonging to family Linaceae.	19. *A. Lini.*
Host belonging to family Malphigiaceae.	20. *A. Byrsonimatis.*
Host belonging to family Rutaceae.	21. *A. Xanthoxyli.*
Host belonging to family Polygalaceae.	
Aeciospores small, 16–20 μ in diameter.	22. *A. renatum.*
Aeciospores larger, 18–26 μ in diameter.	23. *A. polygalinum.*
Host belonging to family Euphorbiaceae.	
Pycnia subcuticular.	
Aeciospores small, 12–18 x 13–19 μ.	24. *A. seriatum.*
Aeciospores larger, 15–20 x 16–25 μ.	25. *A. favaceum.*
Pycnia subepidermal.	
Aeciospore-wall thick, 2–2.5 μ.	26. *A. Mozinnae.*
Aeciospore-wall much thinner, 1–1.5 μ.	
Aeciospores small, 13–16 x 16–19 μ.	27. *A. albicans.*
Aeciospores larger, 18–22 x 19–24 μ.	28. *A. Tithymali.*
Aeciospore-wall very thin, 1 μ or less.	29. *A. Argithamniae.*
Host belonging to family Cyrillaceae.	30. *A. Cyrillae.*
Host belonging to family Hippocastanaceae.	31. *A. Aesculi.*
Host belonging to family Sapindaceae.	32. *A. Reichei.*
Host belonging to family Vitaceae.	33. *A. mexicanum.*
Host belonging to family Tiliaceae.	34. *A. Triumfettae.*

Host belonging to family Fouquieriaceae. 35. *A. Cannonii.*
Host belonging to family Thymelaeaceae. 36. *A. hydnoideum.*
Host belonging to family Elaeagnaceae. 37. *A. arctoum.*
Host belonging to family Onagraceae.
  Aeciospores large, with wall 2–3 μ thick. 38. *A. Anograe.*
  Aeciospores small, with wall 1 μ thick. 39. *A. Betheli.*
Host belonging to family Ammiaceae.
  Aecia cupulate, margin revolute. 40. *A. Ligustici.*
  Aecia cylindric, margin erect. 41. *A. mutum.*
Host belonging to family Apocynaceae.
  Aeciospore-wall thin, 1–1.5 μ.
    Aeciospores large, 16–22 μ in diameter, the wall evenly thick. 42. *A. Apocyni.*
    Aeciospores small, 14–16 μ in diameter, the wall thicker above. 43. *A. Thenardiae.*
  Aeciospore-wall thick, 2–4 μ.
    Aeciospores large, 20–29 μ in diameter, the wall thicker above. 44. *A. leporinum.*
    Aeciospores small, 16–25 μ in diameter, the wall evenly thick. 45. *A. Thevetiae.*
Host belonging to family Convolvulaceae. 46. *A. Jacquemontiae.*
Host belonging to family Heliotropiaceae. 47. *A. guatemalense.*
Host belonging to family Boraginaceae.
  Aeciospores rather small, 13–19 x 17–24 μ. 48. *A. Tournefortiae.*
  Aeciospores larger, 19–23 x 23–26 μ. 49. *A. Bourreriae.*
Host belonging to family Ehretiaceae. 50. *A. Cordiae.*
Host belonging to family Verbenaceae. 51. *A. Verbenae.*
Host belonging to family Lamiaceae.
  Aeciospores small, 17–20 x 19–24 μ, the wall 1 μ. 52. *A. zonatum.*
  Aeciospores larger, 19–23 x 23–29 μ, the wall 1.5–2.5 μ. 53. *A. subsimulans.*
Host belonging to family Solanaceae.
  Aecia scattered over large areas, systemic. 54. *A. Physalidis.*
  Aecia in limited groups.
    Aeciospores inconspicuously verrucose. 55. *A. tenerius.*
    Aeciospores noticeably verrucose. 56. *A. Lycii.*
Host belonging to family Scrophulariaceae.
  Aecia scattered over the whole leaf. 57. *A. Collinsiae.*
  Aecia in limited groups. 58. *A. insulsum.*
Host belonging to family Bignoniaceae. 59. *A. simplicius.*
Host belonging to family Acanthaceae. 60. *A. Tracyanum.*
Host belonging to family Rubiaceae.
  Aeciospore-wall evenly thick.
    Aeciospore-wall 1 μ thick or less. 61. *A. Ixorae.*
    Aeciospore-wall 1–2 μ thick.
      Aecia scattered over entire leaf. 62. *A. Borreriae.*
      Aecia in groups.
        Aeciospore-wall colorless. 63. *A. Bouvardiae.*
        Aeciospore-wall pale-yellow. 64. *A. abscedens.*
  Aeciospore-wall much thicker above.
    Aeciospore-wall cinnamon-brown. 65. *A. pulverulentum.*
    Aeciospore-wall colorless. 66. *A. Farameae.*
Host belonging to family Caprifoliaceae. 67. *A. Triostei.*
Host belonging to family Campanulaceae. 68. *A. Campanulastri.*
Host belonging to family Ambrosiaceae. 69. *A. Ivae.*
Host belonging to family Carduaceae.
  Of the tribe Eupatorieae.
    Aeciospore-wall evenly thick.
      Aeciospore-wall 1–1.5 μ thick. 70. *A. arcularium.*
      Aeciospore-wall 1 μ thick. 71. *A. ampliatum.*
    Aeciospore-wall much thicker above. 72. *A. steviicola.*
  Of the tribe Astereae. 73. *A. Keerliae.*
  Of the tribe Heliantheae.
    Aeciospore-wall thin, 1–1.5 μ.
      Aeciospores large, 24–40 μ in length. 74. *A. Wedeliae-hispidae.*
      Aeciospores small, 16–27 μ in length.
        Peridial cells slightly or not imbricated. 75. *A. Batesii.*
        Peridial cells strongly imbricated. 76. *A. Dahliae.*
    Aeciospore-wall thick, 2.5–3.5 μ. 77. *A. Borrichiae.*
  Of the tribe Helenieae. 78. *A. conspicuum.*
  Of the tribe Senecioneae.
    Aeciospore-wall colorless.
      Aeciospore-wall thin, 1 μ or less. 79. *A. Mesadeniae.*
      Aeciospore-wall moderately thick, 1.5–2.5 μ. 80. *A. Liabi.*
      Aeciospore-wall very thick, 2.5–3.5 μ. 81. *A. praecipuum.*
    Aeciospore-wall cinnamon-brown. 82. *A. hualtatinum.*
  Of the tribe Mutisieae. 83. *A. Pereziae.*
Host belonging to family Cichoriaceae. 84. *A. columbiense.*

1. **Aecidium anthericicola** Arth. Bull. Torrey Club **45**: 149. 1918.

O. Pycnia amphigenous, in small orbicular groups, small, honey-yellow becoming chocolate-brown, inconspicuous, subepidermal, flattened-globoid, 80–98 by 64–77 μ; ostiolar filaments up to 60 μ long, not projecting beyond the ostiole.

I. Aecia hypophyllous in annular groups 2–7 mm. across about the pycnia, at first bullate then erect, the margin erose; peridial cells quadrate, 16–20 by 20–26 μ, abutted or overlapping, the outer wall slightly or no thicker than the inner wall, 3–6 μ; aeciospores globoid, 16–20 by 19–23 μ; wall colorless, thin, 1.5 μ, very finely verrucose, appearing smooth when wet.

ON LILIACEAE:
Anthericum nanum Baker, Mexico (state).
TYPE LOCALITY: Dedregal near Tlalpam, Valley of Mexico, Mexico, on *Anthericum nanum*.
DISTRIBUTION: Known only from the type locality.

2. **Aecidium Yuccae** Arth. Bull. Torrey Club **49**: 194. 1922.

O. Pycnia amphigenous, in small and crowded groups, inconspicuous, honey-yellow, subepidermal, small, globoid, 80–115 μ in diameter; ostiolar filaments prominent, 45–65 μ long, aggluginated into a column.

I. Aecia amphigenous, irregularly arranged in loose groups, cylindric, 0.3–0.5 mm. in diameter, somewhat higher; peridium firm, erect, the margin finely erose; peridial cells angularly globoid or ellipsoid in face view, rectangular or somewhat rhomboidal in section, 16–18 by 23–35 μ, abutted or slightly overlapping, the outer wall 3–5 μ thick, smooth, the inner wall thinner, about 2 μ, finely verrucose; aeciospores globoid or broadly ellipsoid, 16–20 by 19–24 μ; wall colorless, thin, 1 μ or less, very closely and finely verrucose.

ON DRACAENACEAE:
Yucca glauca Nutt., Nebraska.
TYPE LOCALITY: Crawford, Nebraska, on *Yucca glauca*.
DISTRIBUTION: Known only from the type locality.

3. **Aecidium Trillii** Burrill, Bot. Gaz. **9**: 190. 1884.

O. Pycnia amphigenous, crowded in groups 1–3 mm. across, conspicuous, subepidermal, chestnut- or chocolate-brown, flattened globoid, 112–128 μ wide by 65–75 μ high; ostiolar filaments 64–80 μ long, agglutinated into a column up to 50 μ in diameter, conspicuous.

I. Aecia hypophyllous, crowded in circular areas about the pycnia, the groups 4–6 mm. in diameter, cupulate, 0.2–0.3 mm. in diameter, 0.1–0.2 mm. high; peridium light yellow, the margin recurved, erose or somewhat lacerate, soon falling apart; peridial cells rhombic in side view, 17–23 by 26–29 μ, slightly overlapping, the outer wall thick, 7–10 μ, transversely striate, the inner wall thin, about 1.5 μ, finely and closely verrucose; aeciospores globoid or ellipsoid, 19–22 by 20–24 μ; wall colorless or slightly yellow, thin, 1 μ or less, very finely and closely verrucose.

ON TRILLIACEAE:
Trillium erectum L., New York.
Trillium grandiflorum (Michx.) Salisb., New York.
Trillium recurvatum Beck, Illinois.
TYPE LOCALITY: Pine Hills, Union County, Illinois, on *Trillium recurvatum*.
DISTRIBUTION: Local in Illinois and New York.

4. **Aecidium Zephyranthis** Shear, Bull. Torrey Club **29**: 454. 1902.

O. Pycnia amphigenous, crowded in elliptic groups 1–2 mm. long, conspicuous, subepidermal, honey-yellow becoming chestnut-brown, flattened-globoid, 65–110 μ in diameter, 50–80 μ high; ostiolar filaments up to 70 μ long, agglutinated but spreading out somewhat after emerging from the ostiole to form an inverted top-shaped mass.

I. Aecia amphigenous, crowded about the pycnia in groups 5–10 mm. long, short-cylindric, 0.2 mm. in diameter, 0.2–0.3 mm. high; peridium light-yellow, the margin somewhat recurved, erose; peridial cells rhomboidal in side view, 16–19 by 23–35 μ, in face view irregularly oblong or elliptic, 13–20 μ wide, overlapping, the outer wall 7–9 μ thick, transversely striate, the inner wall 3–4 μ thick, closely and coarsely verrucose; aeciospores irregularly globoid or ellipsoid, 16–20 by 20–27 μ; wall colorless, 1–1.5 μ thick, closely and very finely verrucose.

ON AMARYLLIDACEAE:
Zephyranthes sp., Mexico (state).
TYPE LOCALITY: Tlalpam, Valley of Mexico, Mexico, on *Zephyranthes* sp.
DISTRIBUTION: Southern Mexico in vicinity of the type locality.

5. **Aecidium modestum** Arth. Bull. Torrey Club **46**: 124. 1919.

O. Pycnia caulicolous, few in groups 1–3 mm. across, inconspicuous, subepidermal, dark-brown, globoid, 160–220 μ in diameter; ostiolar filaments up to 90 μ long, projecting only slightly beyond the ostiole.

I. Aecia caulicolous, crowded in elliptic or oblong groups 4–10 mm. long, short-cylindric or laterally compressed, 0.3–0.4 by 0.3–0.7 mm. broad by 0.5–0.7 mm. high; peridium white, erect, erose or somewhat lacerate; peridial cells narrow and seen with difficulty in side view, in face view very irregular in shape, 19–32 by 35–58 μ, the outer wall thin, about 1–1.5 μ, almost smooth, the inner and side walls 2–3 μ thick, closely and prominently verrucose; aeciospores ellipsoid or oblong, 23–26 by 27–32 μ; wall colorless, 1–1.5 μ thick, finely and closely verrucose.

ON AMARYLLIDACEAE:
Zephyranthes sp., Hidalgo.
TYPE LOCALITY: Near Ixmiquilpan, Hidalgo, on *Zephyranthes* sp.
DISTRIBUTION: Known only from the type locality.

6. **Aecidium residuum** Arthur, sp. nov.

O. Pycnia amphigenous, numerous, small, inconspicuous, pale honey-yellow, subepidermal, deep-seated, scarcely protruding above surface of leaf, globoid, 50–80 μ in diameter; ostiolar filaments few, 30–35 μ long.

I. Aecia amphigenous, on scarcely discolored spots, usually concentric, large, 0.3–0.5 mm. in diameter, pustulate, deep-seated, the epidermis overarching, opening by a central aperture; peridium fragile, evanescent; peridial cells ovoid in face-view, angularly globoid in section, abutted, 20–24 by 22–26 μ, the outer wall 5–7 μ thick, transversely striate, smooth, the inner wall 3–5 μ thick, coarsely verrucose; aeciospores globoid or broadly ellipsoid, 19–24 by 22–27 μ; wall colorless, moderately thick, 1.5–2.5 μ, finely and prominently verrucose.

ON IRIDACEAE:
Sisyrinchium graminoides Bickn., Oklahoma.
Type collected at Enid, Oklahoma, on *Sisyrinchium graminoides*, November 1, 1919, *W. H. Ballamy*, communicated by R. S. Kirby.

7. **Aecidium Graebnerianum** P. Henn. Hedwigia **37**: 273. 1898.

Aecidium alaskanum Trel. Harriman Alaska Exp. Crypt. 37. 1904.

O. Pycnia not seen.

I. Aecia usually hypophyllous, crowded in groups 2–4 mm. across, cupulate, 0.3–0.4 mm. in diameter, 0.1–0.2 mm. high; peridium light-yellow, the margin recurved, erose; peridial cells rhombic or rhomboidal, 19–26 by 23–35 μ, the outer wall thick, 7–12 μ, transversely striate, the inner wall thinner, 3–5 μ, closely tuberculate; aeciospores irregularly globoid or ellipsoid, 15–18 by 16–22 μ; wall colorless, thin, 1–1.5 μ, very closely and finely verrucose.

ON ORCHIDACEAE:
Coeloglossum bracteatum (Willd.) Parl. (*Habenaria bracteata* R. Br.), Alaska.
Limnorchis borealis (Cham.) Rydb., Montana.
Limnorchis dilatata (Pursh) Rydb. (*Habenaria dilatata* Hook.), Alaska, Oregon, Washington.
Limnorchis leucostachys (Lindl.) Rydb. (*Habenaria leucostachys* S. Wats.), Alaska, California.
Limnorchis stricta (Lindl.) Rydb. (*Habenaria gracilis* S. Wats.), Alaska; British Columbia.
Limnorchis viridiflora (Cham.) Rydb. (*Habenaria hyperborea* Coult.), Alaska.
Orchis aristata Fisch., Alaska.
TYPE LOCALITY: On the Clukow River, Death Valley, California, on *Habenaria dilatata*.
DISTRIBUTION: Southeastern California, northward into Alaska.
EXSICCATI: Barth. N. Am. Ured. *1401;* Sydow, Ured. *1799*.

8. **Aecidium Boehmeriae** Arth. Bull. Torrey Club **34**: 590. 1907.

O. Pycnia epiphyllous, subepidermal, few in small groups about 1 mm. across, honey-yellow becoming brownish, punctiform, not conspicuous, globoid or depressed-globoid, small, 70–90 μ in diameter by 50–75 μ high; ostiolar filaments up to 65 μ long.

I. Aecia hypophyllous, gregarious, in irregular or sometimes in annular groups 2–10 mm. across, on larger discolored spots, short, small, about 0.1 mm. in diameter, rather pale-yellow;

peridium colorless, margin erose, recurved; peridial cells rhombic or rhomboidal in side view, small, 13–19 by 19–26 μ, the outer wall thick, 5–7 μ, transversely striate, smooth, the inner wall thinner, 3 μ, closely and finely verrucose; aeciospores globoid, often angular, very small, 10–13 by 13–16 μ; wall pale-yellow, very thin, 0.5–1 μ, very finely verrucose, appearing smooth when wet.

ON URTICACEAE:
Boehmeria cylindrica (L.) Willd., District of Columbia, Indiana, Maryland.
TYPE LOCALITY: Takoma Park, District of Columbia, on *Boehmeria cylindrica*.
DISTRIBUTION: Vicinity of the type locality and one locality in central Indiana.

9. **Aecidium libertum** Arth. Bull. Torrey Club 37: 580. 1910.

O. Pycnia hypophyllous, in small groups usually in the points of the teeth, conspicuous, subepidermal, honey-yellow to chestnut-brown, somewhat flattened-globoid, 125–160 μ in diameter by 95–110 μ high; ostiolar filaments up to 128 μ long, projecting in a short, broad column.

I. Aecia hypophyllous, evenly distributed over the whole surface of the leaf, substratum neither thickened nor discolored; peridium short-cylindric, 0.3–0.4 mm. in diameter, margin somewhat recurved, lacerate; peridial cells cuboidal in side view, 13–19 by 23–26 μ, in face view square or rectangular, 15–23 μ wide, squarely abutted except a downwardly imbricated outer tooth, the outer wall smooth, 5–7 μ, the inner wall slightly thinner, 3–4 μ, and closely verrucose; aeciospores angularly globoid, 17–19 by 18–23 μ; wall pale-yellow, thin, 1 μ, closely and finely verrucose.

ON URTICACEAE:
Urtica chamaedryoides Pursh, Oklahoma.
TYPE LOCALITY: Sapulpa, Oklahoma, on *Urtica chamaedryoides*.
DISTRIBUTION: Known only from the type locality.

10. **Aecidium Loranthi** Thüm. in Lorentz, Veg. Entre Rios 3. 1878.

O. Pycnia amphigenous, in small groups with the aecia, rather inconspicuous, subepidermal, dark-brown, globoid or ellipsoid, 128–190 by 160–270 μ; ostiolar filaments 120–160 μ long, not projecting much beyond the ostiole.

I. Aecia amphigenous, upon somewhat thickened areas of the leaf up to 8 mm. in diameter, cupulate, 0.3–0.6 mm. in diameter, up to 1 mm. high; peridium light-yellow, fragile, soon breaking off; peridial cells rhombic or rhomboidal, 21–26 by 30–42 μ, abutted or slightly overlapping, the outer wall about 7 μ thick, transversely striate, the inner wall 4–7 μ, closely tuberculate; aeciospores globoid, ellipsoid or oblong, 26–35 by 35–45 μ; wall colorless, 2–2.5 μ thick, closely and finely verrucose.

ON LORANTHACEAE:
Psittacanthus calyculatus (DC.) G. Don, Guatemala.
TYPE LOCALITY: Vicinity of Santa Candida, South America, on *Loranthus uruguensis*.
DISTRIBUTION: Guatemala; also in South America.

11. **Aecidium Pisoniae** Arth. & Johnston, Mem. Torrey Club 17: 161. 1918.

O. Pycnia amphigenous, few, on discolored areas, noticeable, subepidermal, dark chestnut-brown, globoid, 96–128 μ in diameter; ostiolar filaments 64–80 μ long.

I. Aecia hypophyllous, crowded in groups 3–5 mm. across, cupulate, 0.1–0.2 mm. in diameter; peridium colorless, the margin erose, somewhat recurved, the peridial cells rhomboidal in longitudinal section, 12–16 by 16–34 μ, abutted, the wall 1.5–2 μ thick, the outer smooth, the inner very finely and closely verrucose; aeciospores globoid or oblong, 15–16 by 16–23 μ; wall tinted with yellow, thin, about 1 μ, very finely and closely verrucose.

ON ALLIONIACEAE:
Pisonia aculeata L. (?), Cuba.
TYPE LOCALITY: Ceballos, Cuba, on *Pisonia aculeata*?
DISTRIBUTION: Known only from the type locality.

12. **Aecidium Mirabilis** Dietel & Holway; Holway, Bot. Gaz. 24: 37. 1897.

O. Pycnia epiphyllous, loosely grouped upon reddish-brown spots about 1 cm. across, noticeable, subepidermal, dark chestnut-brown, slightly flattened-globoid, 95–140 μ in diameter, 80–95 μ high; ostiolar filaments up to 30 μ long, not projecting beyond the ostiole.

I. Aecia hypophyllous, crowded in groups about 1 cm. across, cylindric, 0.3–0.4 mm. in diameter, 0.7–0.9 mm. high; peridium yellow, the margin recurved, lacerate; peridial cells rhomboidal, 18–23 by 29–32 μ, slightly overlapping, the outer wall thick, 7–10 μ, finely transversely striate, the inner wall thinner, 3–4 μ, very closely and strongly verrucose; aeciospores ellipsoid or oblong, 16–19 by 21–28 μ; wall colorless, thin, 1–1.5 μ, closely and finely verrucose.

On Allioniaceae:
Mirabilis multiflora A. Gray, Arizona.
Mirabilis sp., Mexico (state).
Type locality: Rio Hondo near City of Mexico, Mexico, on *Mirabilis* sp.
Distribution: Southern Arizona to southern Mexico.

13. **Aecidium indecisum** Arth. Bull. Torrey Club 47: 474. 1920.

O. Pycnia hypophyllous, scattered over all or large areas of the leaves among the aecia, conspicuous, subepidermal, honey-yellow, globoid, 80–110 μ in diameter; ostiolar filaments long, 75–100 μ.

I. Aecia hypophyllous, scattered over all or large areas of the leaf, cupulate, 0.3–0.5 mm. in diameter, projecting but slightly above the host-tissue; peridium remaining somewhat incurved and covered by the host-tissues, erose; peridial cells oblong or rhomboidal in side view, 16–26 by 30–40 μ, abutted or slightly overlapping, the outer wall thick, 8–10 μ, transversely striate, smooth, the inner wall thinner, 3–6 μ, closely and rather finely verrucose; aeciospores ellipsoid or globoid, 16–19 by 21–26 μ; wall colorless, thin, 1–1.5 μ, closely and inconspicuously verrucose.

On Ranunculaceae:
Ranunculus Bolanderi Greene, California.
Ranunculus californicus Benth., California.
Ranunculus Lobbii A. Gray, California.
Type locality: Berkeley, California, on *Ranunculus californicus*.
Distribution: Central California.
Exsiccati: Barth. N. Am. Ured. *1303*; Sydow, Ured. *900*.

14. **Aecidium Butlerianum** Rosen & Arth.; Rosen & Kirby, Phytopathology 9: 572. 1919.

O. Pycnia epiphyllous, gregarious, on bluish-brown spots 1–3 mm. across, inconspicuous, honey-yellow becoming blackish, punctiform, subepidermal, globoid seen in section, 140–160 μ in diameter; ostiolar filaments short.

I. Aecia hypophyllous, opposite the pycnia on slightly hypertrophied spots 1–3 mm. across, low, 1.5–3 mm. broad; peridium fragile; peridial cells polygonal in face view, oblong or rhombic in section, 12–16 by 28–35 μ, overlapping, the outer wall 5–7 μ thick, transversely striate, smooth, the inner wall 1.5–2 μ thick, verrucose; aeciospores ellipsoid, 20–26 by 29–37 μ; wall colorless, 2.5–3.5 μ thick, closely and noticeably verrucose.

On Berberidaceae:
Mahonia trifoliolata (Moric.) Fedde (*Berberis trifoliolata* Moric., *B. trifoliata* Hartw.), Texas.
Type locality: Boerne, Texas, on *Berberis trifoliolata*.
Distribution: Known only from the type locality.

15. **Aecidium plenum** Arth. Bull. Torrey Club 45: 149. 1918.

O. Pycnia amphigenous, crowded in groups 0.2–0.3 mm. across, cinnamon-brown, small, inconspicuous, subepidermal.

I. Aecia hypophyllous, crowded in circular groups about the pycnia, 1–2 mm. across, without conspicuous spots, cupulate or short cylindric; peridium erect or somewhat recurved,

irregularly and deeply lacerate; peridial cells angularly oblong in face view, about 20 by 30 μ, narrowly oblong in radial section, somewhat overlapping, about 8–10 by 30 μ, the outer wall 5–9 μ thick, smooth, the inner wall 3–6 μ, coarsely verrucose; aeciospores globoid or ellipsoid, 16–21 by 18–24 μ; wall colorless, thin, 1 μ, finely and closely verrucose.

ON PAPAVERACEAE:
Argemone intermedia Sweet, Texas.
TYPE LOCALITY: Burkburnett, Texas, on *Argemone intermedia.*
DISTRIBUTION: Known only from the type locality.

16. **Aecidium Mitellae** Ellis & Ev.; Arth. Bull. Torrey Club **47**: 475. 1920.

O. Pycnia not seen.

I. Aecia hypophyllous, in crowded circular groups 2–3 mm. across; peridium cupulate, small; aeciospores globoid or broadly ellipsoid, 15–18 by 18–26 μ; wall thin, 1 μ, colorless, minutely verrucose.

ON SAXIFRAGACEAE:
Mitella nuda L., Newfoundland.
TYPE LOCALITY: Shoal Point, Bay of Islands, Newfoundland, on *Mitella nuda.*
DISTRIBUTION: Known only from the type locality.

17. **Aecidium Chamaecristae** Arth. Bull. Torrey Club **46**: 123. 1919.

Aecidium Cassiae Ellis & Kellerm. Trans. Kans. Acad. **10**: 91, hyponym. 1887. Not *A. Cassiae* Bres. 1891.

O. Pycnia amphigenous, in small groups upon reddish discolored areas of the leaf, noticeable, subepidermal, honey-yellow becoming chocolate-brown, globoid, 70–96 by 80–96 μ; ostiolar filaments 60–100 μ long, agglutinated into a column.

I. Aecia amphigenous, loosely grouped upon reddish spots 2–8 mm. across, cupulate, 0.1–0.2 mm. in diameter, short; peridium yellow, recurved, erose; peridial cells rhombic or rhomboidal, 16–23 by 26–35 μ, considerably overlapping, the outer wall thick, 9–10 μ, transversely striate, smooth, the inner wall thinner, 4–6 μ, closely verrucose; aeciospores globoid or ellipsoid, 15–19 by 18–25 μ; wall colorless, thin, 1–1.5 μ, finely and closely verrucose.

ON CAESALPINACEAE:
Chamaecrista fasciculata (Michx.) Greene (*Cassia fasciculata* Michx.), Kansas, Nebraska.
TYPE LOCALITY: Manhattan, Kansas, on *Cassia "Chamaecrista,"* error for *C. fasciculata.*
DISTRIBUTION: Eastern Kansas and Nebraska.
EXSICCATI: Ellis & Ev. N. Am. Fungi *1825.*

18. **Aecidium Onobrychidis** Burrill, Bot. Gaz. **9**: 189. 1884.

Aecidium amphigenum Ellis & Kellerm. Jour. Myc. **2**: 4. 1886. Not *A. amphigenum* Hazsl. 1877.
Aecidium Kellermanni De-Toni, in Sacc. Syll. Fung. **7**: 788. 1888.
Aecidium Daleae Kellerm. & Swingle, Jour. Myc. **5**: 13. 1889.
Aecidium Lupini Peck, Ann. Rep. N. Y. State Mus. **46**: 33. 1893.
Aecidium Falcatae Arth. Bull. Torrey Club **33**: 32. 1906.
Aecidium Petalostemonis Kellerm. & Carl.; Arth. Torrey Club Bull. **34**: 589. 1907.
Aecidium fluxum Arth. Bull. Torrey Club **34**: 590. 1907.

O. Pycnia amphigenous, crowded in small groups on discolored spots, noticeable, subepidermal, honey-yellow becoming chestnut-brown, globoid or flattened-globoid, 100–160 by 80–140 μ; ostiolar filaments 50–100 μ long, agglutinated into a column.

I. Aecia hypophyllous or amphigenous, crowded in groups 2–6 mm. across on discolored spots, cupulate, 0.2–0.3 mm. in diameter; peridium yellowish, the margin recurved, lacerate; peridial cells rhomboidal in side view, 16–27 by 26–42 μ, considerably overlapping, the outer wall thick, 5–12 μ, transversely striate, the inner wall thinner, 3–5 μ, closely and rather prominently verrucose; aeciospores globoid or ellipsoid, 18–27 by 21–29 μ; wall colorless, 1–2 μ thick, smooth or inconspicuously verrucose except for an irregularly placed and shaped band of coarse verrucose markings.

ON FABACEAE:
Baptisia australis (L.) R. Br., Kansas.
Baptisia bracteata Ell. (*B. leucophaea* Nutt.), Kansas, Nebraska.

Falcata comosa (L.) Kuntze (*Amphicarpa monoica* Ell.), Iowa, North Dakota, Wisconsin.
Glycine Apios L. (*Apios Apios* MacM., *A. tuberosa* Moench), Iowa, Nebraska.
Lupinus argenteus Pursh, South Dakota, Wyoming.
Lupinus perennis L., New York, Wisconsin.
Orbexilum Onobrychis (Nutt.) Rydb. (*Psoralea Onobrychis* Nutt.), Illinois.
Parosela enneandra (Nutt.) Britt. (*Dalea enneandra* Nutt., *D. laxiflora* Pursh), Kansas, Nebraska.
Petalostemon candidus (Willd.) Michx., Kansas, Nebraska.
Petalostemon oligophyllus (Torr.) Rydb., Nebraska.
Petalostemon purpureus (Vent.) Rydb. (*P. violaceus* Michx.), Kansas, Nebraska.
Petalostemon villosus Nutt., Colorado, Nebraska, North Dakota.

TYPE LOCALITY: LaSalle County, Illinois, on *Psoralea Onobrychis*.

DISTRIBUTION: Plains of western North Dakota and central Colorado eastward to Illinois, and one station in New York.

EXSICCATI: Barth. Fungi Columb. *2204, 2296, 2303, 2497, 2602, 2604, 2903, 3301;* Barth. N. Am. Ured. *1, 402, 706, 1502;* Brenckle, Fungi Dak. *326, 501;* Clements, Crypt. Form: Colo. *595;* Ellis, N. Am. Fungi *1436;* Ellis & Ev. Fungi Columb. *1473;* Ellis & Ev. N. Am. Fungi *1845;* Sydow, Ured. *1448*.

19. **Aecidium Lini** Dearness & House, Bull. N. Y. State Mus. **179**: 26. 1915.

O. Pycnia amphigenous or caulicolous, on yellowish or reddish spots 2–6 mm. long, noticeable, subepidermal, deeply seated in the host-tissue, honey-yellow becoming chestnut-brown, ellipsoid or oblong, 112–128 μ wide by 128–160 μ high; ostiolar filaments up to 60 μ long, not projecting beyond the ostiole.

I. Aecia hypophyllous or caulicolous, loosely grouped upon the discolored spots with the pycnia, cupulate, small, 0.1–0.2 mm. in diameter; peridium pale-yellow, the margin erose, somwhat recurved; peridial cells rhombic or rhomboidal in side view, 19–23 by 24–29 μ, overlapping considerably, the outer wall thick, 7–10 μ, faintly transversely striate, the inner wall thinner, 3–4 μ, closely and rather finely verrucose; aeciospores ellipsoid or oblong, 13–16 by 18–23 μ; wall colorless, 1.5 μ thick, minutely and inconspicuously verrucose.

ON LINACEAE:
Linum virginianum L., New York.

TYPE LOCALITY: New York, on *Linum virginianum*.

DISTRIBUTION: Known only from the type locality.

20. **Aecidium Byrsonimatis** P. Henn. Hedwigia **34**: 101. 1895.

Aecidium byrsonimaticola P. Henn. Hedwigia **34**: 322. 1895.
Endophyllum singulare Dietel & Holway, Bot. Gaz. **31**: 336. 1901.
Aecidium Byrsonimae Kern & Kellerm. Jour. Myc. **13**: 24. 1907.
Aecidium singulare Arth. Am. Jour. Bot. **5**: 540. 1918.

O. Pycnia amphigenous and caulicolous, preceding or among the aecia, numerous, evenly scattered over the hypertrophied leaves and branches, conspicuous, subcuticular, becoming chestnut-brown, conic, large, 150–200 μ broad by 75–85 μ high; ostiolar filaments wanting.

I. Aecia amphigenous and caulicolous, from an unlimited mycelium causing extensive hypertrophy, numerous, scattered, often crowded, cylindric, deep-seated, 0.5–0.7 mm. in diameter by 1–1.5 mm. high; peridium white, margin erose, somewhat recurved, often deeply torn; peridial cells rhomboidal in side view, 19–26 by 35–65 μ, overlapping, the outer wall 3–4 μ thick, smooth, the inner wall 5–7 μ thick, coarsely papillate-verrucose, the markings somewhat deciduous; aeciospores angularly oval or oblong, often truncate at base and narrowed above, 26–35 by 39–47 μ; wall pale golden-brown, thick, 3–5 μ, much thicker above, 5–15 μ, closely and coarsely verrucose, the markings somewhat deciduous, leaving smooth patches.

ON MALPHIGIACEAE:
Byrsonima crassifolia (L.) DC., Guatemala, Jalisco.
Byrsonima variabilis A. Juss., Nicaragua.

TYPE LOCALITY: Goyaz, Brazil, on *Byrsonima* sp.

DISTRIBUTION: Central Mexico southward through Central America; also in South America.

21. **Aecidium Xanthoxyli** Peck, Bot. Gaz. **6**: 275. 1881.

O. Pycnia mostly epiphyllous or caulicolous, intermingled with or opposite the aecia, conspicuous, subepidermal, chestnut-brown, globoid or flattened-globoid, 100–140 by 100–130 μ; ostiolar filaments up to 30 μ long, projecting slightly beyond the ostiole.

I. Aecia hypophyllous or caulicolous, sometimes amphigenous, loosely grouped upon spots 0.2–2 cm. in diameter or sometimes occupying most or all of the leaflet, cylindric, 0.2–0.3 mm. in diameter, up to 1 mm. high; peridium yellow, the margin erect, erose; peridial cells rhomboidal, 16–26 by 26–40 μ, overlapping, the outer wall thick, 7–14 μ, transversely striate, the inner wall thinner, 3–8 μ, closely and strongly verrucose; aeciospores globoid or ellipsoid, 15–23 by 18–26 μ; wall colorless, rather thin, 1–2 μ, very closely and finely verrucose.

On Rutaceae:
Fagara Clava-Herculis (L.) Small (*Xanthoxylum Clava-Herculis* L.), Texas.
Fagara fruticosa (A. Gray) Small (*Xanthoxylum carolinianum fruticosum* A. Gray), Alabama.
Xanthoxylum americanum Mill., Iowa, Kansas, Missouri, Nebraska, Wisconsin.
Type locality: Decorah, Iowa, on *Xanthoxylum americanum*.
Distribution: Southwestern Wisconsin to Nebraska southward to Alabama and central Texas.
Exsiccati: Barth. N. Am. Ured. *102, 1004;* Carleton, Ured. Am. *6;* Ellis & Ev. Fungi Columb. *1477;* Ellis. N. Am. Fungi *1013;* Rab.-Wint. Fungi Eur. *2928;* Sydow, Ured. *1548*.

22. **Aecidium renatum** Arth. Bull. Torrey Club **47**: 477. 1920.

O. Pycnia epiphyllous, inconspicuous, subepidermal.

I. Aecia hypophyllous, thickly covering the surface of the leaf, short-cylindric, 0.2–0.4 mm. in diameter; peridium erect, erose; peridial cells rhomboidal, 16–19 by 26–32 μ, strongly overlapping, the outer wall 3–5 μ thick, smooth, the inner wall 6–9 μ, prominently verrucose; aeciospores globoid, 19–23 by 21–24 μ; wall colorless, thin, 1 μ, closely and finely verrucose.

On Polygalaceae:
Polygala longa Blake, New Mexico.
Type locality: Organ Mountains, New Mexico, on *Polygala longa*.
Distribution: Known only from the type locality.

23. **Aecidium polygalinum** Peck, Bot. Gaz. **6**: 275. 1881.

O. Pycnia epiphyllous, in small groups about 1 mm. in diameter, rather inconspicuous, subepidermal, honey-yellow, globoid or broadly ellipsoid, 100–120 by 140–150 μ; ostiolar filaments short, up to 30 μ, slightly projecting.

I. Aecia hypophyllous, loosely grouped upon yellowish spots 3–10 mm. in diameter, cupulate, 0.2–0.3 mm. in diameter; peridium yellow, the margin erose, recurved; peridial cells rhomboidal, 16–23 by 32–35 μ, overlapping, the outer wall thick, 8–10 μ, transversely striate, the inner wall thinner, 3.5–4 μ, closely and strongly verrucose; aeciospores irregularly globoid or ellipsoid, 15–20 by 18–26 μ; wall colorless, thin, 1 μ, very closely and finely verrucose.

On Polygalaceae:
Polygala Senega L., Iowa, Michigan, Wisconsin.
Type locality: Ann Arbor, Michigan, on *Polygala Senega*.
Distribution: Isolated localities from southern Michigan to northeastern Iowa.
Exsiccati: Ellis. N. Am. Fungi *1009;* Rab.-Wint. Fungi Eur. *3319;* Sydow, Ured. *1396*.

24. **Aecidium seriatum** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 541. 1918.

O. Pycnia hypophyllous, numerous in circular groups 1–3 mm. in diameter, surrounded by the aecia, punctate, noticeable, subcuticular, hemispheric, chestnut-brown, 80–112 μ wide by 40–75 μ high; ostiolar filaments wanting.

Aecia hypophyllous, abundant in more or less evident concentric circles surrounding the pycnia, the outer circle 1.5–2 cm. in diameter; sori low-cupulate, 0.25–0.5 mm. in diameter, scarcely exceeding the somewhat raised and browned ruptured epidermis in height; peridium white, margin rather smoothly torn; peridial cells almost rectangular in radial longitudinal section, 15–22 μ thick by 18–26 μ long, overlapping about one-fourth by a downward extension of the outer part of the outside wall, the outer wall smooth, transversely striate, 6–8 μ thick, the inner wall closely and prominently verrucose, 3–4 μ thick; aeciospores irregularly globoid, 12–18 μ wide by 13–19 μ long; wall colorless, about 1 μ thick, very finely and inconspicuously verrucose, often appearing smooth.

On Euphorbiaceae:
Eumecanthus lancifolius (Schlecht.) Millsp. (*Euphorbia lancifolia* Schlecht.), Guatemala.
Type locality: Cahabor river, Alta Vera Paz, Guatemala, on *Eumecanthus lancifolius*.
Distribution: Known only from the type locality.

25. **Aecidium favaceum** Arth. Mycologia **7**: 254. 1915.

O. Pycnia amphigenous, very numerous on discolored spots 3–5 mm. across, minute, evident, subcuticular, 60–90 μ across, flattened; ostiolar filaments wanting.

I. Aecia hypophyllous, crowded in groups on the pycnial area, hemispheric, the sori open; peridium about 0.3 mm. across, delicate and evanescent; peridial cells oblong, 12–16 by 22–26 μ, readily separating, the walls 3–5 μ thick, the inner slightly thicker and strongly verrucose, the outer smooth; aeciospores globoid or broadly ellipsoid, 15–20 by 16–25 μ; wall nearly or quite colorless, 1.5–2 μ thick, minutely and closely verrucose.

ON EUPHORBIACEAE:
Phyllanthus nobilis (L.f.) Müll.-Arg., Porto Rico.
TYPE LOCALITY: Hormigueros, Porto Rico, on *Phyllanthus nobilis*.
DISTRIBUTION: Porto Rico.

26. **Aecidium Mozinnae** Arth. Bull. Torrey Club **45**: 152. 1918.

O. Pycnia chiefly epiphyllous, few in orbicular groups, honey-yellow, inconspicuous, subepidermal, globoid, 90–125 μ across; ostiolar filaments present, abundant, up to 65 μ long, agglutinated into a column.

I. Aecia hypophyllous, encircling the pycnial area, on yellowish spots 2–5 mm. across; peridium cylindric, the margin erect and erose; peridial cells quadrate or rectangular, 19–24 by 29–34 μ, abutted or slightly overlapping, the outer wall 10–12 μ thick, transversely striate, smooth, the inner wall 3–5 μ thick, strongly verrucose; aeciospores angularly ellipsoid or globoid, 19–23 by 24–29 μ; wall nearly or quite colorless, 2–2.5 μ thick, closely and noticeably verrucose.

ON EUPHORBIACEAE:
Mozinna spathulata Ortega (*Jatropha spathulata* Müll.-Arg.), Guanajuato.
TYPE LOCALITY: State of Guanajuato, Mexico, on *Mozinna spathulata*.
DISTRIBUTION: Known only from the type locality.

27. **Aecidium albicans** Arth. & Holway; Arth. Mycologia **10**: 146. 1918.

O. Pycnia hypophyllous, few, usually wanting, associated when present with the small groups of aecia, subepidermal, yellowish-brown, ovoid, 26–48 by 48–67 μ; ostiolar filaments wanting.

I. Aecia hypophyllous, solitary, scattered or in small groups of two to four, short-cylindric, 0.1 mm. or less across, 0.1–0.3 mm. high; peridium white, the margin recurved, erose; peridial cells rhombic, 12–13 by 16–19 μ, abutted, the outer wall smooth, the inner wall very finely and closely verrucose, both walls 1.5–3 μ thick; aeciospores angularly globoid or ellipsoid, 13–16 by 16–19 μ; wall colorless, 1–1.5 μ thick, finely and closely verrucose.

ON EUPHORBIACEAE:
Phyllanthus acidus (L.) Skeels, Salvador.
Phyllanthus acuminatus Vahl. Costa Rica, Guatemala.
TYPE LOCALITY: Orotina, Costa Rica, on *Phyllanthus acuminatus*.
DISTRIBUTION: Central America.

28. **Aecidium Tithymali** Arth. Bull. Torrey Club **45**: 151. 1918.

O. Pycnia hypophyllous, scattered sparsely over the surface of the leaf, preceding and accompanying the aecia, punctiform, honey-yellow or brownish, noticeable, subepidermal, globoid or flask-shaped, 110–150 μ broad; ostiolar filaments 60–100 μ long, agglutinated into a column.

I. Aecia hypophyllous, evenly and loosely scattered, at first bullate and opening by a pore or irregular break of the epidermis; peridium erect or recurved, torn, fragile; peridial cells rhomboidal, 10–15 by 23–27 μ, somewhat overlapping, the outer wall 5–7 μ thick, transversely striate, the inner wall 2–3 μ thick, verrucose; aeciospores globoid or broadly ellipsoid; 18–22 by 19–24 μ; wall nearly or quite colorless, thin, 1–1.5 μ, finely verrucose.

ON EUPHORBIACEAE:
Tithymalus commutatus (Engelm.) Klotzsch & Garcke (*Euphorbia commutata* Engelm.), Indiana, Iowa, Maryland, Wisconsin.
Tithymalus leiococcus (Engelm.) Small (*Euphorbia texana* Boiss.), Texas.
Tithymalus missouriensis (Norton) Small (*Euphorbia dictyosperma* auct.), Nebraska.
TYPE LOCALITY: Lafayette, Indiana, on *Tithymalus commutatus*.
DISTRIBUTION: Local from Maryland to eastern Nebraska and southern Texas.
EXSICCATI: Barth. N. Am. Ured. *703*.

29. **Aecidium Argithamniae** Arth. Bull. Torrey Club **33**: 33. 1906.

O. Pycnia epiphyllous, few, upon yellowish, red-bordered spots, conspicuous, subepidermal, deeply seated in the tissue, honey-yellow becoming chocolate-brown, ellipsoid, 160–175 μ broad by 225–240 μ high; ostiolar filaments up to 90 μ long, projecting but little beyond the ostiole.

I. Aecia hypophyllous, circinating opposite the pycnia on spots 2–5 mm. across, cupulate, 0.2–0.3 mm. in diameter; peridium pale-yellow, the margin recurved, lacerate; peridial cells rhomboidal in side view, 15–16 by 32–35 μ, somewhat overlapping, the outer wall 5–6 μ, smooth, the inner wall 3–4 μ thick, closely verrucose; aeciospores globoid or ellipsoid, 15–18 by 18–23 μ; wall nearly colorless, very thin, 1 μ or less, very closely and finely verrucose, appearing smooth.

ON EUPHORBIACEAE:
Chiropetalum Schiedeanum (Müll.-Arg.) Pax (*Argyrothamnia Schiediana* Müll.-Arg.) (?), Hidalgo.
TYPE LOCALITY: Trinidad, Hidalgo, Mexico, on "*Argithamnia*" *Schiediana*.
DISTRIBUTION: Known only from the type locality.

30. **Aecidium Cyrillae** Arth. Bull. Torrey Club **45**: 150. 1918.

O. Pycnia epiphyllous, few on reddish-brown spots, inconspicuous, subepidermal, globoid or flask-shaped, 128–140 μ broad by 160–175 μ high; ostiolar filaments up to 60 μ long, slightly projecting beyond the ostiole.

I. Aecia hypophyllous, in groups of two to eight, rarely more, on reddish-brown spots 2–4 mm. across, short-cylindric, white; peridium erect, erose; peridial cells quadrangular in radial section, 16–21 by 24–32 μ, with a strongly overlapping projection, the outer wall 4–6 μ thick, smooth, the inner wall 7–9 μ thick, often thickened up to 13 μ at the apex, verrucose; aeciospores irregularly ellipsoid or globoid, 19–23 by 23–26 μ; wall colorless, thin, 1–1.5 μ, greatly thickened above, 7–9 μ, closely and finely verrucose.

ON CYRILLACEAE:
Cyrilla racemiflora L., Louisiana, Mississippi.
TYPE LOCALITY: Ocean Springs, Mississippi, on *Cyrilla racemiflora*.
DISTRIBUTION: Near the coast of the Mississippi Sound.

31. **Aecidium Aesculi** Ellis & Kellerm. Bull. Torrey Club **11**: 114. 1884.

O. Pycnia epiphyllous, crowded in groups about 1 mm. in diameter upon yellowish-brown spots, noticeable, subepidermal, honey-yellow, slightly flattened-globoid, about 130 μ wide by 120 μ high; ostiolar filaments up to 40 μ long, projecting slightly beyond the ostiole.

I. Aecia hypophyllous, loosely grouped upon yellowish-brown spots 2–6 mm. across, cylindric, 0.1–0.2 mm. in diameter, 0.5–1.2 mm. long; peridium light-yellow, the margin at first erect, becoming recurved and lacerate; peridial cells rhombic or rhomboidal, 18–23 by 24–35 μ, slightly overlapping, the outer wall thick, 9–12 μ, transversely striate, the inner wall thinner, 3.5–5 μ, closely verrucose; aeciospores globoid or ellipsoid, 17–22 by 21–26 μ; wall colorless, thin, 1 μ, very closely and finely verrucose.

ON HIPPOCASTANACEAE:
Aesculus arguta Buckl., Kansas.
Aesculus glabra Willd., Kansas, Nebraska.
TYPE LOCALITY: Manhattan, Kansas, on *Aesculus glabra*.
DISTRIBUTION: North-central Kansas and adjoining Nebraska.
EXSICCATI: Barth. Fungi Columb. *2301;* Barth, N. Am. Ured. *501;* Ellis, N. Am. Fungi *1429;* Ellis & Ev. Fungi Columb. *1296;* Kellerm. & Swingle, Kans. Fungi *1;* Roum. Fungi Gall. *3865;* Sydow, Ured. *1198*.

32. **Aecidium Reichei** Dietel, Ann. Myc. **12**: 85. 1914.

O. Pycnia amphigenous or caulicolous, in small groups, subepidermal, brownish, globoid in section, 100–140 μ in diameter; ostiolar filaments up to 135 μ long, slightly projecting.

I. Aecia hypophyllous or caulicolous, in small groups 1–5 mm. across, cupulate, 0.2 mm. in diameter; peridium yellowish, the margin erect or incurved, erose; peridial cells rhomboidal in longitudinal section, 16–19 by 29–42 μ, abutted or slightly overlapping, the outer wall transversely striate, about 10 μ thick, smooth, the inner wall coarsely verrucose, 4–7 μ; aeciospores irregularly globoid or oblong, 13–20 by 20–29 μ; wall colorless, 1–1.5 μ thick, finely and closely verrucose.

ON SAPINDACEAE:
Cardiospermum Halicacabum L., Mexico (state).
TYPE LOCALITY: [Near City of Mexico], Mexico, on *Cardiospermum Halicacabum*.
DISTRIBUTION: Known only from the type locality.

33. **Aecidium mexicanum** Dietel & Holway; Holway, Bot. Gaz. **24**: 36. 1897.

Aecidium Clemensae Arth. Bull. Torrey Club **46**: 122. 1919.

O. Pycnia amphigenous, grouped or scattered upon light-colored spots 3–4 mm. in diameter, conspicuous, subepidermal, honey-yellow becoming chocolate-brown, globoid or flattened-globoid, 95–110 μ broad by 85–100 μ high; ostiolar filaments up to 90 μ long.

I. Aecia hypophyllous, grouped on light-colored spots 3–6 mm. across, short-cylindric, 0.2–0.3 mm. in diameter, 0.3–0.5 mm. high; peridium white, the margin erect, erose, rarely revolute and lacerate; peridial cells rhomboidal or rectangular, 18–24 by 29–35 μ, considerably overlapping, the outer wall 5–7 μ thick, transversely striate, smooth, the inner wall 3.5–4 μ thick, closely verrucose; aeciospores globoid, 19–24 by 21–27 μ; wall colorless, rather thick, 1.5–2 μ, very closely and finely verrucose.

ON VITACEAE:
Cissus incisa (Nutt.) DesMoul., Oklahoma.
Cissus sp., Mexico (state).
TYPE LOCALITY: Near City of Mexico, Mexico, on *Cissus* sp.
DISTRIBUTION: Southwestern Oklahoma to southern Mexico.

34. **Aecidium Triumfettae** P. Henn. Hedwigia **35**: 259. 1896.

O. Pycnia amphigenous, crowded in small groups 1–1.5 mm. in diameter upon yellowish spots, conspicuous, subepidermal, dark chestnut-brown, globoid or flask-shaped, 100–110 μ broad by 95–110 μ high; ostiolar filaments up to 90 μ long, somewhat agglutinated into a column.

I. Aecia hypophyllous, crowded upon yellowish spots 3–10 mm. in diameter; peridium white, the margin recurved, somewhat fimbriate; peridial cells rhombic or rhomboidal, 19–26 by 32–39 μ, overlapping somewhat, the outer wall 7–9 μ thick, transversely striate, the inner wall 5–7 μ thick, strongly verrucose; aeciospores globoid, 15–19 by 19–23 μ; wall colorless, 1.5–2 μ thick, very closely and finely verrucose.

ON TILIACEAE:
Triumfetta polyandra DC. (*T. insignis* S. Wats.), Jalisco.
TYPE LOCALITY: Loreto, Argentina, on *Triumfetta* sp.
DISTRIBUTION: Southern Mexico; also in South America.

35. **Aecidium Cannonii** D. Griff. Bull. Torrey Club **34**: 210. 1907.

O. Pycnia chiefly epiphyllous, crowded in small groups 1–1.5 mm. in diameter upon dark discolored spots, inconspicuous, subepidermal, flattened-globoid, 80–110 μ broad by 50–65 μ high; ostiolar filaments up to 100 μ long, projecting in a short agglutinated column.

I. Aecia hypophyllous, crowded upon dark discolored areas 5–10 mm. in diameter, cylindric, 0.2–0.3 mm. in diameter, up to 1 mm. high; peridium white, the margin recurved, erose; peridial cells rhombic or rhomboidal, 19–26 by 26–39 μ, overlapping by a downward projection of the outer wall, the outer wall thick, 9–11 μ, faintly transversely striate, the inner wall

thinner, 3–4 μ, closely verrucose; aeciospores angularly globoid or ellipsoid, 24–27 by 29–31 μ; wall colorless, thick, 2.5–3.5 μ, very closely and finely verrucose, appearing smooth.

ON FOUQUIERIACEAE:
Fouquieria splendens Engelm., Arizona.
TYPE LOCALITY: Sabiño Cañon, Santa Catalina mountains, Arizona, on *Fouquieria splendens*.
DISTRIBUTION: Known only from the type locality.

36. **Aecidium hydnoideum** Berk. & Curt. Grevillea 3: 61. 1874.

O. Pycnia amphigenous, crowded in small groups 1–2 mm. in diameter upon yellowish spots, noticeable, subepidermal, honey-yellow becoming chestnut-brown, flattened-globoid, 80–100 μ broad by 50–70 μ high; ostiolar filaments up to 55 μ long, agglutinated into a short column.

I. Aecia hypophyllous, crowded upon yellowish spots 2–10 mm. in diameter, cupulate or short-cylindric, 0.3–0.5 mm. in diameter; peridium white, the margin recurved, lacerate; peridial cells rhomboidal, 15–19 by 19–27 μ, slightly overlapping, the outer wall 5–9 μ thick, faintly transversely striate, the inner wall 2.5–4 μ thick, closely and strongly verrucose; aeciospores globoid or ellipsoid, 12–17 by 14–19 μ; wall colorless, thin, 1 μ or less, very closely and finely verrucose.

ON THYMELAEACEAE:
Dirca palustris L., Alabama, Indiana, Iowa, Maine, Michigan, Minnesota, Missouri, New York, Ohio, Wisconsin.
TYPE LOCALITY: Alabama, on *Dirca palustris*.
DISTRIBUTION: Northern Alabama and Maine, westward to Missouri and northern Minnesota.
EXSICCATI: Barth. Fungi Columb. *4501;* Barth. N. Am. Ured. *901;* Ellis & Ev. N. Am. Fungi *1816;* Rab.-Wint. Fungi Eur. *3017;* Rav. Fungi Car. 4: *94;* Roum. Fungi Gall. *3862;* Thüm. Myc. Univ. *1120*.

37. **Aecidium arctoum** Arth. Bull. Torrey Club 47: 477. 1920.

O. Pycnia epiphyllous, and to a less extent hypophyllous among the aecia, numerous, rather inconspicuous, small, subepidermal, in section globoid, 128–160 μ in diameter; ostiolar filaments prominent, up to 80 μ long.

I. Aecia hypophyllous, diffused on slightly paler spots 3–7 mm. across, cupulate, very small, 0.1–0.2 mm. in diameter; peridium delicate, erect or somewhat recurved, the margin erose or fimbriate; peridial cells rhomboidal, 16–19 by 28–32 μ, somewhat overlapping, the outer wall 1–1.5 μ thick, smooth, the inner wall 3–6 μ thick, moderately verrucose; aeciospores globoid, or some of them oblong, 21–26 by 23–29 μ; wall colorless, thin, 1–1.5 μ, minutely verrucose.

ON ELAEAGNACEAE:
Elaeagnus angustifolia L., North Dakota.
TYPE LOCALITY: Kulm, North Dakota, on *Elaeagnus angustifolia*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Brenckle, Fungi Dak. *476*.

38. **Aecidium Anograe** Arth. Bull. Torrey Club 28: 664. 1901.

O. Pycnia amphigenous, grouped on the spots with the aecia, inconspicuous, subepidermal, honey-yellow becoming brownish, globoid, 100–120 μ in diameter by 80–100 μ high; ostiolar filaments 30–80 μ long.

I. Aecia amphigenous, chiefly hypophyllous, gregarious on roundish or irregular reddened spots, cylindric, 0.2–0.3 mm. in diameter by 0.5–0.6 mm. high; peridium white, the margin erect, toothed; peridial cells rectangular, 18–24 by 22–35 μ, slightly overlapping, the outer wall 6–10 μ, transversely striate, the inner wall 3–5 μ, coarsely verrucose; aeciospores irregularly globoid or ellipsoid, 18–23 by 22–26 μ; wall pale-yellow, thick, 2–3 μ, evenly verrucose.

ON ONAGRACEAE:
Anogra Nuttallii (Sweet) Spach, Nebraska.
TYPE LOCALITY: Long Pine, Nebraska, on *Anogra "pallida,"* error for *A. Nuttallii*.
DISTRIBUTION: Known only from the arid northwestern part of Nebraska.
EXSICCATI: Barth. Fungi Columb. *2601;* Barth. N. Am. Ured. *1701*.

39. **Aecidium Betheli** Arth. Bull. Torrey Club **47**: 476. 1920.

O. Pycnia not seen.

I. Aecia hypophyllous, in small and crowded groups 1–3 mm. across, on a hemispheric, hypertrophied substratum, cupulate, small, 0.1–0.2 mm. in diameter; peridium low, erect, the margin erose; peridial cells readily falling apart, rhomboidal, 13–18 by 19–23 μ, strongly overlapping, the outer wall 7–9 μ thick, transversely striate, smooth, the inner wall 1 μ, evenly and noticeably verrucose; aeciospores globoid, small, 13–18 by 16–18 μ; wall colorless, thin, 1 μ or less, very finely and evenly verrucose.

ON ONAGRACEAE:
Jussiaea californica (S. Wats.) Jepson, California.
TYPE LOCALITY: Long Beach, California, on *Jussiaea californica*.
DISTRIBUTION: Known only from the type locality.

40. **Aecidium Ligustici** Ellis & Ev. Bull. Torrey Club **11**: 73. 1884.

O. Pycnia epiphyllous, scattered upon yellowish swollen areas 0.7–2 cm. across, noticeable, subepidermal, honey-yellow becoming chestnut-brown, globoid, 110–128 μ in diameter; ostiolar filaments up to 40 μ long, projecting and agglutinated into a short column.

I. Aecia mostly hypophyllous, loosely grouped upon yellow swollen areas of the blade and veins, cupulate, 0.2–0.5 mm. in diameter; peridium white, fragile, projecting only slightly beyond the host-tissue, the margin revolute, lacerate; peridial cells oblong or ellipsoid in face view, 17–23 by 29–37 μ, in side view narrow, usually collapsed, overlapping, the walls about 2–3 μ thick, finely and closely verrucose; aeciospores globoid or ellipsoid, 13–19 by 18–23 μ; wall colorless, thin, 1–1.5 μ, closely and finely verrucose.

ON AMMIACEAE:
Ligusticum scoticum L., Maine; Quebec.
TYPE LOCALITY: Island of Anticosti, Gulf of St. Lawrence, on *Ligusticum scoticum*.
DISTRIBUTION: Coastal region from Maine to the mouth of the St. Lawrence River.
EXSICCATI: Thaxter, Rel. Farl. *208*.

41. **Aecidium mutum** Arthur, sp. nov.

O. Pycnia amphigenous, loosely surrounded by the aecia, numerous, conspicuous, honey-yellow becoming brownish, subepidermal, in section globoid, 85–125 μ in diameter; ostiolar filaments up to 90 μ in length.

I. Aecia amphigenous, gregarious in small groups 1–3 mm. across or on petioles elongate, cylindric, 0.2–0.3 mm. in diameter, 0.5–1 mm. high; peridium firm, yellowish, the margin erect, erose; peridial cells rhomboidal, 16–18 by 24–34 μ, considerably overlapping, the outer wall 8–9 μ thick, transversely striate, smooth, the inner wall, 3–3.5 μ thick, very finely verrucose-rugose; aeciospores angularly globoid or ellipsoid, 16–18 by 18–24 μ; wall colorless, 1–1.5 μ thick, very finely verrucose.

ON AMMIACEAE:
Musineon divaricatum (Pursh) Coult. & Rose, South Dakota.
Type collected at Newell, South Dakota, June 12, 1912 *W. P. Carr*.
EXSICCATI: Barth. Fungi Columb. *3846;* Barth. N. Am. Ured. *643;* Brenckle, Fungi Dak. *204*.

42. **Aecidium Apocyni** Schw. Schr. Nat. Ges. Lepizig **1**: 68. 1822.

Aecidium (*Caeoma*) *Apocynatum* Schw. Trans. Am. Phil. Soc. II. **4**: 309. 1832.

O. Pycnia amphigenous, crowded in small groups about 1 mm. in diameter upon yellow or brown spots, noticeable, subepidermal, chocolate-brown, globoid, 65–80 μ in diameter; ostiolar filaments up to 80 μ long, agglutinated and projecting in a column almost as wide as the pycnium.

I. Aecia hypophyllous, circinating about the pycnia upon slightly swollen areas 1.5–5 mm. across, cupulate, 0.1–0.3 mm. in diameter, slightly projecting above the host-tissue; peridium pale-yellow, the margin erect, erose; peridial cells rhomboidal, 16–19 by 26–32 μ, overlapping, the outer wall 3–7 μ thick, transversely striate, smooth, the inner wall 3–4 μ thick, closely and

coarsely tuberculate; aeciospores angularly globoid, 15–19 by 18–22 μ; wall colorless, thin, 1–1.5 μ, closely and minutely verrucose.

ON APOCYNACEAE:
Apocynum cannabinum L., Delaware, District of Columbia, New Jersey, North Carolina, Virginia.
Apocynum androsaemifolium L., Massachusetts.
TYPE LOCALITY: Salem, North Carolina, on *Apocynum cannabinum*.
DISTRIBUTION: Central North Carolina to eastern Massachusetts.
EXSICCATI: Thaxter, Rel. Farl. *206*.

43. **Aecidium Thenardiae** Arth. Bull. Torrey Club **45**: 150. 1918.

O. Pycnia amphigenous, upon spots with the aecia, few, rather inconspicuous, subepidermal, chestnut- or chocolate-brown, 100–128 μ in diameter; ostiolar filaments short, not projecting beyond the ostiole.

I. Aecia hypophyllous, in circular groups 8–10 mm. across, often circinating on somewhat larger, yellowish spots, short-cylindric; peridium white, the margin erect, erose or torn; peridial cells in face view oblong, 16–22 by 24–30 μ, in side view rhomboidal, 13–15 μ wide, somewhat overlapping, the outer wall 5–6 μ thick, transversely striate, the inner wall 3–4 μ thick, moderately verrucose; aeciospores quadrately globoid, 14–16 μ in diameter; wall colorless, thin, 1–1.5 μ in diameter, somewhat thicker above, 2–6 μ, finely and closely verrucose.

ON APOCYNACEAE:
Thenardia Galeottiana Baill., Oaxaca.
TYPE LOCALITY: Near Oaxaca, Mexico, on *Thenardia Galeottiana*.
DISTRIBUTION: Known only from the type locality.

44. **Aecidium leporinum** Arth. Bull. Torrey Club **37**: 578. 1910.

O. Pycnia not seen.

I. Aecia hypophyllous, gregarious in circular groups 1–3 mm. across, crowded on substratum, scarcely thickened and little discolored, cylindric, 0.2–0.4 mm. high; peridium erect or somewhat recurved, erose; peridial cells strongly imbricated, rhomboidal below, becoming ovate-lanceolate above when seen in radial section, the outer wall nearly or quite smooth, the inner wall somewhat thicker, closely and prominently verrucose with slender elongate warts; aeciospores angularly and broadly ellipsoid or nearly globoid, 18–21 by 24–29 μ; wall pale-yellow, rather thick, 2–2.5 μ, greatly thickened above, 7–9 μ, closely and finely verrucose.

ON APOCYNACEAE:
Macrosiphonia brachysiphon (Torr.) A. Gray, Chihuahua.
TYPE LOCALITY: Guayamoba Cañon, Sierra Madre Mountains, Chihuahua, Mexico, on *Macrosiphonia brachysiphon*.
DISTRIBUTION: Known only from the type locality.

45. **Aecidium Thevetiae** Sacc. Ann. Myc. **11**: 14. 1913.

O. Pycnia epiphyllous, opposite the aecia.

I. Aecia hypophyllous, crowded in annular groups 5–6 mm. across, cylindric, 1 mm. high, 0.2–0.3 mm. in diameter; peridium colorless, erect, the margin fimbriate; peridial cells oblong-polygonal, 16 by 25 μ, the wall thick; aeciospores angularly globoid, 16–19 μ in diameter; wall colorless, thick, 3–4 μ, appearing smooth in water.

ON APOCYNACEAE:
Thevetia cuneifolia A. DC., Veracruz.
TYPE LOCALITY: Veracruz, Mexico, on *Thevetia cuneifolia*.
DISTRIBUTION: Known only from the type locality.

46. **Aecidium Jacquemontiae** Ellis & Ev. Jour. Myc. **8**: 11. 1902.

O. Pycnia not seen.

I. Aecia hypophyllous, crowded in groups 1–5 mm. in diameter upon brown areas, sometimes circinating, cupulate, 0.1–0.3 mm. in diameter, long covered by the epidermis; peridium white, not projecting beyond the ruptured epidermis, the margin erect, erose; peridial cells

oblong or broadly oblong in side view, 15–19 by 23–29 μ, abutted or slightly overlapping, the outer wall 4–7 μ thick, transversely striate, the inner wall 2–3 μ thick, closely verrucose; aeciospores angularly ellipsoid, 13–14 by 18–19 μ; wall colorless, 1 μ thick, closely and minutely verrucose.

On Convolvulaceae:
Jacquemontia pentantha (Jacq.) G. Don, Yucatan.
Thyella hirtiflora (Mart. & Gall.) House (*T. lactescens* House, *Jacquemontia lactescens* Seem., *Ipomoea hirtiflora* Mart. & Gall.), Panama.
Type locality: Yucatan, Mexico, on *Jacquemontia pentantha*.
Distribution: Southern Mexico and Central America.

47. **Aecidium guatemalense** Kern & Kellerm. Jour. Myc. **13**: 23. 1907.

O. Pycnia epiphyllous, gregarious, abundant on discolored spots opposite the aecia, inconspicuous, punctiform, subepidermal, becoming dark-brown, globoid, 95–115 μ wide, 80–105 μ high; ostiolar filaments up to 90 μ long.

I. Aecia hypophyllous, gregarious, numerous, on indefinite discolored spots, 0.5–1.5 cm. across, especially extending along the veins, short, 0.2–0.3 mm. in diameter; peridium white, the margin erect, slightly erose; peridial cells broadly rhomboidal, 14–16 by 15–25 μ long, somewhat overlapping, the walls of equal thickness, 2–4 μ, the inner moderately verrucose, the outer smooth, transversely striate; aeciospores globoid, 16–21 by 18–23 μ; wall colorless, thin, about 1 μ, finely and inconspicuously verrucose.

On Heliotropiaceae:
Heliotropium indicum L., Guatemala.
Type locality: Guálan, Department Zacapa, Guatemala, on *Heliotropium indicum*.
Distribution: Known only from the type locality.

48. **Aecidium Tournefortiae** P. Henn. Hedwigia **34**: 338. 1895.

O. Pycnia amphigenous, in small groups 1–4 mm. in diameter, noticeable, subepidermal, white becoming dark-brown, globoid or ellipsoid, 95–128 μ broad by 80–112 μ high; ostiolar filaments up to 50 μ long, slightly projecting beyond the ostiole.

I. Aecia hypophyllous, loosely grouped upon dark-colored spots 0.5–1.5 cm. in diameter, cupulate, small, about 0.1 mm. in diameter; peridium pale-yellow, the margin erect, erose, fragile; peridial cells rhomboidal, 15–19 by 23–27 μ, slightly overlapping or abutted, the outer wall 3–5 μ thick, transversely striate, the inner wall 2–3 μ, closely verrucose with the markings often uniting and becoming rugose; aeciospores globoid or ellipsoid, 13–19 by 17–24 μ; wall colorless, thin, 1–1.5 μ, very closely and finely verrucose.

On Boraginaceae:
Tournefortia bicolor Sw., Porto Rico.
Tournefortia hirsutissima L., Cuba, Porto Rico.
Tournefortia peruviana Poir., Cuba.
Tournefortia volubilis L., Panama.
Type locality: Blumenau, Santa Catharina, Brazil, on *Tournefortia* sp.
Distribution: West Indies and Panama; also in South America.

49. **Aecidium Bourreriae** Holway; Arth. Bull. Torrey Club **46**: 123. 1919.

O. Pycnia amphigenous, few, in center of spots with the aecia, noticeable, subepidermal, chocolate-brown, flattened-globoid, 128–160 μ broad by 95–110 μ high; ostiolar filaments short, not extending beyond the ostiole.

I. Aecia hypophyllous, loosely grouped in irregular spots 3–10 mm. across, short-cylindric, 0.2–0.3 mm. in diameter; peridium light-yellow, fragile; peridial cells rhombic in side view, 13–15 by 23–24 μ, slightly overlapping, the outer wall 6–7 μ thick, transversely striate, the inner wall 3.5–4.5 μ thick, closely and rather prominently verrucose; acciospores globoid or ellipsoid, 19–23 by 23–26 μ; wall colorless, rather thick, 1.5–2.5 μ, closely and finely verrucose.

On Boraginaceae:
Bourreria havanensis Miers, Bahamas.
Type locality: Nassau, New Providence Island, on *Bourreria havanensis*.
Distribution: Known only from the type locality.

50. **Aecidium Cordiae** P. Henn.; Bres., Henn. & Magn. Bot. Jahrb. **17**: 491. 1893.

Aecidium brasiliense Dietel, Hedwigia **36**: 35. 1897.

O. Pycnia epiphyllous, subepidermal, scattered on yellowish spots 8–10 mm. across, globoid, 80–100 μ in diameter; ostiolar filaments up to 65 μ, slightly projecting.

I. Aecia hypophyllous, on yellowish spots 8–10 mm. across, cupulate, 0.1–0.2 mm. broad, the margin erose; peridial cells rhombic in longitudinal section, 23–26 by 27–32 μ, the outer wall transversely striate, 7–10 μ thick, smooth, the inner wall closely tuberculate, 3–4 μ thick; aeciospores angularly ellipsoid, 20–29 by 23–33 μ; wall colorless, 1–1.5 μ, thicker above, up to 10 μ, closely and finely verrucose.

ON EHRETIACEAE:
Varronia bullata (L.) Jacq. (*Cordia bullata* L.), Haïti.
TYPE LOCALITY: Haïti, on *Cordia bullata*.
DISTRIBUTION: Haïti; also in South America.

51. **Aecidium Verbenae** Speg. Anal. Soc. Ci. Argent. **9**: 174. 1880.

Aecidium verbenicola Speg. Anal. Mus. Nac. Buenos Aires **19**: 323. 1909. Not *A. verbenicola* Ellis & Kellerm. 1884.
Aecidium Lantanae Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 567. 1913.

O. Pycnia hypophyllous, in small groups upon brownish spots about 3 mm. across, subepidermal, globoid, 70–90 μ in diameter; ostiolar filaments about 80 μ long, agglutinate and projecting as a prominent column.

I. Aecia hypophyllous or caulicolous, few in small groups on brownish spots, cupulate, small, about 0.1 mm. across, the margin erose; peridial cells overlapping, rhomboidal in longitudinal section, 13–16 by 19–30 μ, the outer wall, 2–3 μ, transversely striate, smooth, the inner wall, 2–3 μ, closely verrucose; aeciospores globoid, 15–19 μ in diameter; wall colorless, thin, 1 μ or less, very closely and inconspicuously verrucose.

ON VERBENACEAE:
Lantana trifolia L., Nicaragua; Panama.
TYPE LOCALITY: Rio de la Plata, Argentina, on *Verbena litoralis*.
DISTRIBUTION: Central America; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 568, *f. 75*.

52. **Aecidium zonatum** Sacc. Ann. Myc. **11**: 14. 1913.

O. Pycnia epiphyllous, subepidermal, noticeable, dark-brown.

I. Aecia hypophyllous, crowded in brownish spots 2–4 mm. in diameter, encircled by a light-yellow ring 1–2 mm. wide, cupulate, 0.2–0.3 mm. in diameter; peridium yellowish, the margin erect, erose; peridial cells in face view oval or ellipsoid, 23–28 by 33–45 μ, in radial longitudinal section 7–10 μ thick, collapsed, probably thicker, the walls 2–2.5 μ thick, finely and closely verrucose; aeciospores ellipsoid or globoid, 17–20 by 19–24 μ; wall colorless, thin, 1 μ, rather closely and finely verrucose.

ON LAMIACEAE:
Salvia sp., Mexico [Veracruz?].
TYPE LOCALITY: Mexico, on *Salvia* sp.
DISTRIBUTION: Known only from the type locality.

53. **Aecidium subsimulans** Arth. & Mains; Arth. Bull. Torrey Club **47**: 475. 1920.

O. Pycnia amphigenous, on brownish or reddish spots, 2–5 mm. in diameter, noticeable, subepidermal, cinnamon-brown, flattened-globoid, 95–125 μ in diameter by 60–95 μ high; ostiolar filaments up to 125 μ long.

I. Aecia hypophyllous, crowded on spots with the pycnia, cylindric, 0.2–0.3 mm. wide, 0.5–1 mm. high; peridium white, the margin somewhat erect, erose; peridial cells rhomboidal, 19–26 by 32–45 μ, somewhat overlapping, the outer wall thick, 9–13 μ, transversely striate, smooth, the inner wall 4–6 μ thick, closely and rather coarsely verrucose; aeciospores globoid or ellipsoid, 19–23 by 23–29 μ; wall colorless, 1.5–2.5 μ thick, very closely and finely verrucose.

ON LAMIACEAE:
Salvia candicans Mart. & Gal., Puebla.
Salvia Lemmoni A. Gray, Arizona.
Salvia sp., Hidalgo, Mexico (state).
TYPE LOCALITY: Carr Peak, Huachuca mountains, Arizona, on *Salvia Lemmoni*.
DISTRIBUTION: Southern Arizona southward to southern Mexico.

54. **Aecidium Physalidis** Burrill, Bot. Gaz. 9: 190. 1884.

O. Pycnia amphigenous or caulicolous, scattered, covering all or a large portion of the plant, arising from an unlimited mycelium, conspicuous, subepidermal, honey-yellow or pale-brown, globoid or flattened-globoid, 95–120 by 80–100 μ; ostiolar filaments up to 80 μ long, agglutinated into a column.

I. Aecia hypophyllous or caulicolous, scattered, covering all or a large portion of the plant, arising from an unlimited mycelium, cupulate, 0.3–0.5 mm. in diameter; peridium pale-yellow, the margin erose becoming lacerate, recurved; peridial cells rhombic or broadly rhomboidal, 15–23 by 24–32 μ, overlapping somewhat, the outer wall thick, 5–10 μ, transversely striate, the inner wall thinner, 3–4 μ, closely tuberculate-verrucose; aeciospores globoid or ellipsoid, 14–19 by 16–24 μ; wall colorless, 1–2 μ thick, very closely and inconspicuously verrucose.

ON SOLANACEAE:
Physalis comata Rydb., New Mexico, Texas.
Physalis heterophylla Nees (*P. viscosa* Pursh not L.), Colorado, Illinois, Indiana, Nebraska.
Physalis lanceolata Michx., Colorado, Kansas, Nebraska.
Physalis longifolia Nutt., Colorado, Kansas, Nebraska.
Physalis virginiana Mill., Colorado, Missouri, Oklahoma, Wisconsin.
TYPE LOCALITY: Urbana, Illinois, on *Physalis viscosa*.
DISTRIBUTION: Southwestern Wisconsin to the foothills of Colorado, southward to northern Texas and northeastern New Mexico.
EXSICCATI: Barth. Fungi Columb. *3856, 4201;* Barth. N. Am. Ured. *561, 653, 903, 1604, 1803;* Ellis & Ev. Fungi Columb. *558, 1578, 1860;* Ellis & Ev. N. Am. Fungi *2992, 3147*.

55. **Aecidium tenerius** Arth. & Holway; Arth. Mycologia 10: 147. 1918.

O. Pycnia not seen.

I. Aecia hypophyllous, scattered or loosely grouped, round, 0.3–0.8 mm. across; peridium inconspicuous, usually hidden by the persistent epidermis; peridial cells long and narrow, often becoming curved, 5–9 by 29–48 μ, the outer and inner walls quite thin, the inner wall very finely and inconspicuously verrucose; aeciospores globoid or ellipsoid, 19–23 by 24–32 μ; wall colorless, 2–2.5 μ thick, frequently slightly thickened above and below, inconspicuously verrucose, appearing smooth when wet.

ON SOLANACEAE:
Acnistus arborescens Schlecht., Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Acnistus arborescens*.
DISTRIBUTION: Known only from the type locality.

56. **Aecidium Lycii** Arthur, sp. nov.

O. Pycnia amphigenous, numerous, in groups 1–2 mm. across, small, inconspicuous, pale-yellow, subepidermal, slightly protruding above surface of leaf, globoid in section, 100–115 μ in diameter; ostiolar filaments short.

I. Aecia hypophyllous, numerous, in orbicular groups surrounding the pycnia on somewhat discolored spots, cupulate, 0.2–0.3 mm. in diameter; peridium white, short, erect or recurved, the margin erose; peridial cells abutted or somewhat overlapping, polygonal in face-view, squarish-oblong in side-view, 16–20 by 25–30 μ, the outer wall 3–5 μ thick, smooth, the inner wall 1.5–2.5 μ thick, closely and strongly verrucose; aeciospores globoid or broadly ellipsoid, 20–24 by 23–28 μ; wall colorless, 2–3 μ thick, finely and closely verrucose.

ON SOLANACEAE:
Lycium pallidum Miers, Arizona.
Type collected in the Santa Rita Mountains, Arizona, on *Lycium pallidum*, July 21, 1911, *E. O. Wooton*.

57. **Aecidium Collinsiae** Ellis & Ev. Bull. Washburn Lab. Nat. Hist. 1: 4. 1884.

Aecidium Tonellae Dietel & Holway, Erythea 3: 77. 1895.

O. Pycnia hypophyllous, subepidermal, scattered over the entire surface of the leaf, conspicuous, chestnut-brown becoming chocolate-brown, slightly flattened-globoid, 110–160 μ broad by 80–115 μ high; ostiolar filaments up to 80 μ long, agglutinated into a narrow column.

I. Aecia hypophyllous, scattered over the entire surface of the leaf, cupulate, 0.2–0.4 mm. in diameter, about 0.1 mm. high; peridium yellow, the margin recurved, lacerate; peridial cells rhomboidal, 16–25 by 24–35 μ, considerably overlapping, the outer wall thick, 7–10 μ, transversely striate, the inner wall thinner, 3.5–5 μ, closely and strongly verrucose; aeciospores angularly globoid or ellipsoid, 14–18 by 16–20 μ; wall colorless, thin, 1–1.5 μ, closely and finely verrucose.

ON SCROPHULARIACEAE:
Collinsia parviflora Dougl., Oregon, Washington.
Collinsia Rattani A. Gray, Washington.
Tonella tenella (Benth.) Heller (*T. collinsioides* Nutt.), Washington.
TYPE LOCALITY: Falcon Valley, Washington, on *Collinsia parviflora*.
DISTRIBUTION: Southern Washington and northern Oregon.
EXSICCATI: Barth. N. Am. Ured. *202, 301.*

58. **Aecidium insulsum** Arthur, sp. nov.

O. Pycnia amphigenous, in small groups, inconspicuous, pale-yellow, subepidermal, small, submerged beneath surface of leaf, globoid, sometimes angular, 90–125 μ in diameter; ostiolar filaments short.

I. Aecia chiefly hypophyllous, crowded in orbicular groups 1–2 mm. across which often coalesce to cover a large part or all of the leaf, cupulate, small, 0.1–0.2 mm. in diameter; peridium colorless, short, strongly revolute, the margin irregularly lacerate; peridial cells angularly ellipsoid in face-view, rhomboidal in section, 18–21 by 26–30 μ, somewhat overlapping, the outer wall 5–7 μ thick, smooth, the inner wall 1–2 μ thick, coarsely verrucose; aeciospores angularly globoid or quadrilaterally oblong, 16–20 by 18–23 μ; wall thin, 1–1.5 μ, finely verrucose.

ON SCROPHULARIACEAE:
Collinsia parviflora Dougl., Utah.
Type collected at Hot Springs, Utah, on *Collinsia parviflora*, May 29, 1917, *Wyatt W. Jones.*

59. **Aecidium simplicius** Arth. & Johnston, Mem. Torrey Club 17: 162. 1918.

O. Pycnia not seen.

I. Aecia hypophyllous, scattered or indefinitely grouped, cupulate, short, 0.8–1.5 mm. in diameter; peridium white, the margin erect, lacerate; peridial cells rhomboidal, 21–29 μ long, slightly or not at all overlapping, the outer wall transversely striate, rather thick, 4–7 μ, the inner wall rugose, somewhat thinner, 2.5–4 μ; aeciospores globoid, 21–26 by 26–29 μ; wall colorless, rather thin, 1–1.5 μ, very finely and closely verrucose.

ON BIGNONIACEAE:
Tecoma pentaphylla (L.) Juss., Cuba.
TYPE LOCALITY: Taco, Oriente, Cuba, on *Tecoma pentaphylla*.
DISTRIBUTION: Known only from the type locality.

60. **Aecidium Tracyanum** Sydow, Hedwigia Beibl. 40: 129. 1901.

O. Pycnia amphigenous, in small groups 0.5–1.5 mm. in diameter, conspicuous, subepidermal, chestnut-brown, globoid, 90–120 by 80–130 μ; ostiolar filaments up to 65 μ long, projecting slightly beyond the ostiole.

I. Aecia hypophyllous, loosely grouped upon yellowish spots 0.5–1 cm. across, the spots often uniting, covering the leaf, cupulate, small, about 0.1 mm. in diameter; peridium white, the margin somewhat recurved, erose; peridial cells rhomboidal, 15–23 by 30–42 μ, overlapping,

the outer wall 4–7 μ thick, faintly transversely striate, smooth, the inner wall 3–6 μ thick, moderately verrucose, the markings often uniting to form rugose or reticulate arrangements; aeciospores globoid or ellipsoid, 18–23 by 21–26 μ; wall colorless, thin, 0.5–1 μ, very closely and finely verrucose.

ON ACANTHACEAE:
Dyschoriste capitata (Oerst.) Kuntze (*Calophanes capitata* Oerst.), Jalisco.
Dyschoriste oblongifolia (Michx.) Kuntze (*Calophanes oblongifolia* D. Don, *Ruellia oblongifolia* Michx.), Florida.
TYPE LOCALITY: Bradentown, Florida, on *Ruellia* [*oblongifolia*].
DISTRIBUTION: Southern Florida and southern Mexico.

61. **Aecidium Ixorae** Arth. Bull. Torrey Club **47**: 473. 1920.

O. Pycnia epiphyllous, scattered unevenly over large discolored areas often 4–8 cm. across, punctiform, prominent, dark-brown, becoming whitish by age, subepidermal, flattened-hemispheric, 150–200 μ in diameter, about half as high, with a flat hymenium; ostiolar filaments wanting.

I. Aecia hypophyllous, opposite the pycnia, scattered, deep-seated, cylindric, 0.2–0.3 mm. across; peridium colorless, the margin strongly recurved, lacerate; peridial cells rhombohedric, strongly imbricate, the exposed inner face about 16–19 μ across, in section much prolonged downward on outer side, the inner wall about 3 μ thick, verrucose, the outer wall about 2 μ thick, smooth; aeciospores globoid, small, 16–19 μ in diameter; wall colorless, 1 μ or less thick, finely verrucose, appearing smooth.

ON RUBIACEAE:
Ixora ferrea (Jacq.) Benth. (*Siderodendron triflorum* Vahl), Cuba.
TYPE LOCALITY: Bahia Honda, Cuba, on *Ixora ferrea*.
DISTRIBUTION: Known only from the type locality.

62. **Aecidium Borreriae** Pat.; Duss, Énum. Champ. Guad. 7. 1903.

O. Pycnia hypophyllous, numerous, scattered over the entire leaf, conspicuous, subepidermal, dark chestnut- or chocolate-brown, flattened-globoid, 120–150 μ broad by 115–128 μ high; ostiolar filaments not seen.

I. Aecia hypophyllous, loosely scattered over the entire leaf, evidently arising from an unlimited mycelium, cupulate, 0.2–0.3 mm. in diameter; peridium white, strongly recurved, deeply lacerate, fragile; peridial cells rhomboidal, 13–21 by 30–42 μ, considerably overlapping, the outer wall 2.5–3 μ thick, smooth, the inner wall somewhat thicker, 3–4 μ, closely and prominently verrucose; aeciospores globoid or broadly ellipsoid, 18–23 by 19–26 μ; wall colorless, thin, 1–1.5 μ, closely and minutely verrucose.

ON RUBIACEAE:
Hemidiodia ocimifolia (Willd.) K. Schumann (*Spermacoce ocimifolia* Willd.), Guadeloupe, Porto Rico.
TYPE LOCALITY: Basse-Terre, Guadeloupe, on "*Borreria* sp.," now determined as *Hemidiodia ocimifolia*.
DISTRIBUTION: West Indies; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. 5: 569, *f. 76*.

63. **Aecidium Bouvardiae** Dietel & Holway; Holway, Bot. Gaz. **24**: 36. 1897.

Allodus Bouvardiae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.

O. Pycnia epiphyllous, few, crowded in small groups upon brownish spots, inconspicuous, subepidermal, chocolate-brown, flattened-globoid, 95–125 μ in diameter by 64–80 μ high; ostiolar filaments up to 80 μ long, agglutinated into a short column.

I. Aecia hypophyllous, loosely grouped upon brown spots 3–15 mm. in diameter, short-cylindric, about 0.2 mm. in diameter, up to 1 mm. high; peridium white, the margin erect, erose; peridial cells narrowly rhomboidal, 12–19 by 26–39 μ, overlapping, the outer wall 3–6 μ thick, faintly transversely striate, the inner wall 3–5 μ thick, closely and coarsely verrucose; aeciospores globoid or ellipsoid, 15–19 by 17–23 μ; wall colorless, 1–2 μ thick, closely and finely verrucose.

ON RUBIACEAE:
Bouvardia ternifolia (Cav.) Schlecht. (*B. triphylla* Salisb., *B. hirtella* H.B.K.), Guanajuato, Mexico (state), Querétaro.
TYPE LOCALITY: Rio Hondo, near City of Mexico, Mexico, on *Bouvardia triphylla*.
DISTRIBUTION: Central and southern Mexico.

64. **Aecidium abscedens** Arth. Mycologia 7: 315. 1915.

O. Pycnia epiphyllous, numerous on brownish spots 4–9 mm. across, prominent, golden-yellow becoming dark-brown, hemispheric, subcuticular, 90–200 μ broad by about half as high.

I. Aecia hypophyllous, very deep-seated, numerous in crowded groups, cupulate, 0.1–0.3 mm. in diameter, soon open; peridium somewhat revolute, coarsely lacerate; peridial cells oblong, 11–16 by 20–37 μ, colorless, somewhat overlapping, the outer wall 3–5 μ thick, smooth, the inner wall 3–5 μ, moderately verrucose; aeciospores broadly ellipsoid or globoid, 16–21 by 20–27 μ; wall pale-yellow, thin, 1–1.5 μ, very closely and finely verrucose.

ON RUBIACEAE:
Randia mitis L. (*aculeata* L.), Costa Rica, Porto Rico.
Randia Watsoni B. L. Robinson, Jalisco.
TYPE LOCALITY: Aguada, Porto Rico, on *Randia aculeata*.
DISTRIBUTION: Porto Rico, southern Mexico, and Central America.

65. **Aecidium pulverulentum** Arth. Bull. Torrey Club 33: 521. 1906.

O. Pycnia epiphyllous, numerous, gregarious on dark-brown spots 2–9 mm. in diameter, conspicuous, subcuticular, chocolate-brown, hemispheric, 80–140 μ in diameter, 40–55 μ high; ostiolar filaments wanting; pycniospores numerous from a flat hymenium.

I. Aecia hypophyllous, numerous in groups 3–9 mm. in diameter, short-cylindric, deep-seated, small, about 0.1 mm. in diameter; peridium white, evanescent; peridial cells narrowly rhomboidal, 13–16 by 30–45 μ, overlapping, the outer wall about 2.5 μ thick, smooth, the inner wall 3.5–4 μ thick, coarsely verrucose; aeciospores ellipsoid or broadly obovoid, 18–29 by 24–32 μ; wall light cinnamon-brown, 3–4 μ thick, thickened at apex, 7–13 μ, closely and prominently verrucose.

ON RUBIACEAE:
Randia Watsoni B. L. Robinson, Jalisco.
Randia sp., Morelos.
TYPE LOCALITY: Cuernavaca, Morelos, Mexico, on *Randia* sp.
DISTRIBUTION: Southern Mexico.

66. **Aecidium Farameae** Arth. Bull. Torrey Club 42: 592. 1915.

O. Pycnia epiphyllous, in small groups, 1–3 mm. across, or scattered over larger hypertrophied areas, subepidermal, deep-seated, becoming blackish-brown, globoid, 144–200 μ in diameter; ostiolar filaments short, about 30 μ high.

I. Aecia hypophyllous and caulicolous, in circular groups, 2–5 mm. across, on discolored slightly thickened spots, or scattered over large areas and producing considerable distortion on the immature petioles and stems, low-cylindric, small, 0.2–0.3 mm. in diameter; peridium colorless, the margin erect or somewhat incurved, irregularly torn; peridial cells rhomboidal or oblong, overlapping, 18–26 by 32–39 μ, the outer wall rather thin, 3–5 μ, smooth, the inner wall thicker, 5–9 μ, coarsely verrucose; aeciospores angularly globoid or oblong, 23–26 by 26–34 μ; wall colorless, 1.5 μ thick, much thicker above, 7–12 μ, moderately and evenly verrucose.

ON RUBIACEAE:
Faramea occidentalis (L.) A. Rich., Cuba.
TYPE LOCALITY: San Diego de los Baños, Pinar del Rio, Cuba, on *Faramea occidentalis*.
DISTRIBUTION: Known only from the type locality.

67. **Aecidium Triostei** Arth. Bull. Torrey Club 33: 32. 1906.

O. Pycnia amphigenous, crowded in small groups about 2 mm. in diameter, noticeable, subepidermal, light-brown, flattened-globoid, 65–95 μ in diameter, 30–50 μ high; ostiolar filaments up to 30 μ long, only slightly projecting beyond the ostiole.

I. Aecia hypophyllous, circinating about the pycnia in groups 4–5 mm. across, cupulate, 0.1–0.3 mm. in diameter; peridium pale-yellow, the margin erect, erose; peridial cells rhomboidal, 16–21 by 29–32 μ, slightly overlapping, the outer wall 7–8.5 μ thick, transversely striate, the inner wall 4–4.5 μ thick, closely and finely verrucose; aeciospores angularly globoid or ellipsoid, 19–23 by 23–26 μ; wall colorless, thin, 1 μ, closely and minutely verrucose.

ON CAPRIFOLIACEAE:
Triosteum angustifolium L., Missouri.
TYPE LOCALITY: Perryville, Missouri, on *Triosteum angustifolium*.
DISTRIBUTION: Known only from the type locality.

68. **Aecidium Campanulastri** G. W. Wilson, Proc. Iowa Acad. 17: 74. 1911.

O. Pycnia amphigenous, few, loosely grouped upon yellowish spots 4–10 mm. in diameter, inconspicuous, dark-brown, subepidermal, flattened-globoid, 95–110 μ in diameter by 65–80 μ high; ostiolar filaments short, about 50 μ long, not projecting beyond the ostiole.

I. Aecia hypophyllous, loosely grouped upon yellowish spots 4–10 mm. in diameter, cupulate, 0.1–0.3 mm. in diameter; peridium pale-yellow, usually almost entirely covered by the ruptured epidermis, the margin erose, soon breaking away; peridial cells rhomboidal, 12–16 by 21–26 μ, overlapping, the outer wall 3–5 μ thick, transversely striate, the inner wall thinner, 2–3 μ, closely and finely verrucose; aeciospores globoid or ellipsoid, 12–15 by 13–18 μ; wall colorless, thin, 1–1.5 μ, very obscurely verrucose.

ON CAMPANULACEAE:
Campanula americana L. (*Campanulastrum americanum* Small), Iowa, Minnesota.
TYPE LOCALITY: Fayette, Iowa, on *Campanulastrum americanum*.
DISTRIBUTION: Northern Iowa and southern Minnesota.
EXSICCATI: Barth. Fungi Columb. *4603;* Barth. N. Am. Ured. *1102*.

69. **Aecidium Ivae** H. S. Jackson, Proc. Ind. Acad. 1917: 373. 1918.

O. Pycnia amphigenous, crowded on yellowish spots, 3–15 mm. in diameter, noticeable, subepidermal, light-yellow or light chestnut-brown, punctiform, globoid, 95–160 μ in diameter; ostiolar filaments up to 80 μ long.

I. Aecia usually hypophyllous, sometimes amphigenous, crowded on spots with the pycnia, cupulate, 0.2–0.4 mm. in diameter; peridium brownish-yellow, the margin recurved, erose; peridial cells rhomboidal, 19–27 by 35–51 μ, overlapping, the walls 5–7 μ thick, the outer wall smooth, transversely striate, the inner wall closely and coarsely verrucose; aeciospores globoid or ellipsoid, 21–29 by 26–33 μ; wall colorless or pale-yellow, 2–3 μ thick, finely and closely verrucose.

ON AMBROSIACEAE:
Iva frutescens L., Delaware, Florida, Louisiana, Maryland, Virginia.
TYPE LOCALITY: Lewes, Delaware, on *Iva frutescens*.
DISTRIBUTION: Coast of the Atlantic Ocean and Gulf of Mexico from Delaware to Louisiana.

70. **Aecidium arcularium** Arth. Bull. Torrey Club 47: 478. 1920.

O. Pycnia epiphyllous, few, gregarious, minutely punctiform, inconspicuous, subepidermal, globoid or depressed-globoid, 100–130 μ broad by 90–100 μ high; ostiolar filaments up to 45 μ long.

I. Aecia hypophyllous and caulicolous, usually densely crowded in groups 4–10 mm. across; peridium cylindric, the margin erect, erose or deeply lacerate; peridial cells ellipsoid or oblong-angular, 21–29 by 27–40 μ, the cells overlapping, the outer wall 5–10 μ thick, transversely striate, smooth, the inner wall 2–5 μ thick, finely verrucose; aeciospores globoid or ellipsoid, 18–23 by 22–29 μ; wall colorless or pale cinnamon-brown, 1–1.5 μ thick, finely verrucose.

ON CARDUACEAE:
Coleosanthus grandiflorus (Hook.) Kuntze (*Brickellia grandiflora* Nutt.), Arizona, Colorado, New Mexico.
TYPE LOCALITY: Grousemont, Platte Canyon, Colorado, on *Coleosanthus grandiflorus*.
DISTRIBUTION: Northern Colorado to southern Arizona and New Mexico.

71. **Aecidium ampliatum** Jackson & Holway; Arth. Mycologia 10: 148. 1918.

O. Pycnia epiphyllous, numerous, gregarious in the center of yellowish spots, conspicuous, subepidermal, yellowish becoming orange, globoid or flask-shaped, 80–100 μ in diameter; ostiolar filaments short.

I. Aecia hypophyllous, crowded on yellowish spots 2–8 mm. across opposite the pycnia, or more often extending along the sides of the veins, cupulate, 0.1–0.2 mm. in diameter; peridium white or yellowish, the margin recurved, lacerate or erose; peridial cells rhomboidal, 21–23 by 42–45 μ, distinctly overlapping, the outer wall 2.5–3 μ thick, transversely striate, smooth, the inner wall somewhat thicker, 3.5–4.5 μ, prominently rugose-verrucose; aeciospores globoid or broadly ellipsoid, 23–27 by 27–30 μ; wall colorless, thin, 1 μ, very finely and closely verrucose.

ON CARDUACEAE:
Eupatorium sp., Costa Rica.
TYPE LOCALITY: El Alto, near Carthago, Costa Rica, on *Eupatorium* sp.
DISTRIBUTION: Known only from the type locality.

72. **Aecidium steviicola** Arth. Bull. Torrey Club 45: 154. 1918.

O. Pycnia amphigenous, numerous, in loose groups, punctate, honey-yellow becoming brown, noticeable, subepidermal, globoid, 65–80 μ in diameter; ostiolar filaments short, 20–50 μ long, not projecting beyond the ostiole.

I. Aecia hypophyllous, in loose groups surrounding the pycnia on yellowish spots 10–15 mm. across, cupulate, the margin somewhat recurved, erose or lacerate; peridial cells irregularly oblong, 16–19 by 39–45 μ, overlapping by a downward projection of the outer wall, the outer wall 5–7 μ thick, faintly transversely striate, smooth, the inner wall thinner, about 3 μ, closely and rather coarsely verrucose; aeciospores globoid, large, 24–32 by 30–40 μ; wall colorless, rather thin, about 1.5 μ, considerably thickened above, 6–9 μ, minutely and closely verrucose.

ON CARDUACEAE:
Stevia sp., Mexico (state).
TYPE LOCALITY: Popo Park, Federal District, Mexico, on *Stevia* sp.
DISTRIBUTION: Known only from the type locality.

73. **Aecidium Keerliae** Arth. Bull. Torrey Club 45: 154. 1918.

O. Pycnia amphigenous, in close groups 1–2 mm. across, punctiform, honey-yellow becoming brown, noticeable, subepidermal, globoid or slightly flattened-globoid, 95–145 μ broad by 80–125 μ high; ostiolar filaments short, up to 50 μ long, not projecting beyond the ostiole.

I. Aecia hypophyllous, in groups 3–8 mm. across, on somewhat larger, yellowish spots, cupulate, low; peridium slightly recurved, erose or lacerate; peridial cells rhomboidal, 16–18 by 27–31 μ, abutted or slightly overlapping, the outer wall 5–6 μ thick, transversely striate, the inner wall 3.5–4 μ, closely and finely verrucose; aeciospores globoid or ellipsoid, small, 12–18 by 15–20 μ; wall nearly or quite colorless, thin, 1 μ, much thicker above, 3–6 μ, finely and closely verrucose.

ON CARDUACEAE:
Keerlia mexicana A. Gray, Jalisco.
TYPE LOCALITY: Guadalajara, Mexico, on *Keerlia mexicana*.
DISTRIBUTION: Known only from the type locality.

74. **Aecidium Wedeliae-hispidae** Dietel, Ann. Myc. 20: 294. 1922.

O. Pycnia epiphyllous, few in small groups, punctiform, subepidermal, dark-brown, noticeable, in section globoid, 112–130 μ in diameter; ostiolar filaments short.

I. Aecia chiefly hypophyllous, few in small, annular groups, on yellowish spots 1–1.5 mm. across, cylindric; peridium white, 0.3–0.5 mm. in diameter, about 0.4 mm. high, deeply lobed and incised; peridial cells in face view rhomboid or oblong, 12–30 by 30–50 μ, in side view linear-oblong, moderately imbricated, the outer wall 2.5–3 μ thick, smooth, the inner wall 3–5 μ thick, closely verrucose; aeciospores oblong, obovate or ellipsoid, 13–23 by 24–40 μ; wall colorless, thin, 1–1.5 μ, finely and closely verrucose.

ON CARDUACEAE:
Stemmodontia scaberrima Cass. (*Wedelia hispida* H.B.K.), Mexico (state).
TYPE LOCALITY: Mexico, on *Wedelia hispida*.
DISTRIBUTION: Known only from the type locality.

75. **Aecidium Batesii** Arth. Bull. Torrey Club **47**: 479. 1920.

O. Pycnia mostly epiphyllous, in groups 1–3 mm. in diameter, noticeable, subepidermal, chestnut- or chocolate-brown, flattened-globoid, 125–160 μ broad by 90–115 μ high; ostiolar filaments up to 95 μ long, agglutinated into a column.

I. Aecia amphigenous, loosely grouped upon brownish spots 4–8 mm. across, cupulate, 0.5–0.8 mm. in diameter; peridium yellowish, the margin remaining for a time incurved, covered more or less by the epidermis, finally becoming recurved, lacerate; peridial cells oblong, 15–19 by 32–35 μ, slightly overlapping or abutted, the outer wall rather thick, 6–10 μ, transversely striate, smooth, the inner wall thinner, 3–4 μ, closely and finely verrucose; aeciospores angularly globoid, 19–23 by 24–27 μ; wall colorless, 1–1.5 μ thick, very closely and finely verrucose.

ON CARDUACEAE:
Rudbeckia hirta L., Nebraska.
TYPE LOCALITY: Callaway, Nebraska, on *Rudbeckia hirta*.
DISTRIBUTION: Known only from the type locality.

76. **Aecidium Dahliae** Sydow, Ann. Myc. **18**: 155. 1920.

O. Pycnia epiphyllous, in small groups, yellowish-brown, not conspicuous, about 100 μ in diameter.

I. Aecia hypophyllous, in dense groups, 4–8 mm. across, cupulate, about 0.3 mm. in diameter; peridium recurved, the margin lacerate; peridial cells firmly united, rhomboidal, 17–20 by 30–45 μ, strongly imbricated; aeciospores angularly globoid, 15–18 by 16–20 μ; wall nearly colorless, 1–1.5 μ thick, minutely and closely verrucose.

ON CARDUACEAE:
Dahlia rosea Cav. (*D. variabilis* Desf.), Mexico (state).
TYPE LOCALITY: Pedregal, Mexico, on *Dahlia variabilis*.
DISTRIBUTION: Known only from the type locality.

77. **Aecidium Borrichiae** Sydow, Hedwigia Beibl. **40**: 129. 1901.

O. Pycnia amphigenous in small groups about 1 mm. across, punctiform, noticeable, subepidermal, dark-brown, slightly flattened-globoid, 130–160 μ broad by 100–130 μ high; ostiolar filaments up to 130 μ long, agglutinated into a column.

I. Aecia hypophyllous, loosely grouped about the pycnia in groups 2–5 mm. in diameter, cupulate, 0.1–0.2 mm. in diameter; peridium pale-yellow, the margin recurved, soon falling apart; peridial cells rhomboidal in side view, 16–19 by 34–45 μ, considerably overlapping, the outer wall rather thick, 8–10 μ, faintly transversely striate, the inner wall thinner, 4–5 μ, closely verrucose; aeciospores angularly globoid or ellipsoid, 24–28 by 26–32 μ; wall colorless, thick, 2.5–3.5 μ, closely and minutely verrucose.

ON CARDUACEAE:
Borrichia frutescens (L.) DC., Alabama.
TYPE LOCALITY: Fort Morgan, Alabama, on *Borrichia frutescens*.
DISTRIBUTION: Known only from the type locality.

78. **Aecidium conspicuum** Arth. Bull. Torrey Club **45**: 153. 1918.

O. Pycnia amphigenous, crowded in round groups about 1 mm. in diameter, noticeable, subepidermal, honey-yellow, deep-seated, flask-shaped, 125–150 μ broad by 90–125 μ high not including the long ostiole; ostiolar filaments up to 80 μ long, not projecting beyond the ostiole.

I. Aecia amphigenous, very closely crowded in large groups 3–12 mm. across on slightly larger discolored spots, cupulate, 0.3–1 mm. in diameter; peridium white, fragile, the margin erect, erose, not projecting much beyond the ruptured epidermis; peridial cells rhomboidal in side view, 16–26 by 29–39 μ, strongly overlapping, the outer wall thick, 7–11 μ, transversely

striate, the inner wall thinner, 2–3 μ, very closely and finely verrucose; aeciospores angularly globoid, 18–23 by 19–26 μ; wall colorless, thin, 1 μ, very closely and finely verrucose.

ON CARDUACEAE:
Dugaldea Hoopesii (A. Gray) Rydb. (*Helenium Hoopesii* A. Gray), Arizona, Colorado, New Mexico.
TYPE LOCALITY: Snowball Creek, near Pagosa Springs, Colorado, on *Dugaldea Hoopesii*.
DISTRIBUTION: Mountains of southern Colorado into Arizona and New Mexico.

79. **Aecidium Mesadeniae** Arth. Bull. Torrey Club **47**: 479. 1920.

O. Pycnia epiphyllous, few, crowded in small groups 1–2 mm. across, inconspicuous, dark-brown, subepidermal, flattened-globoid, 95–125 μ broad by 50–65 μ high; ostiolar filaments up to 40 μ long, not projecting beyond the ostiole.

I. Aecia usually hypophyllous, crowded in groups 2–6 mm. across, cupulate, small, 0.1–0.3 mm. in diameter; peridium light-yellow, the margin recurved, lacerate; peridial cells rhomboidal, 14–18 by 24–29 μ, overlapping, the outer wall 7–9 μ thick, transversely striate, smooth, the inner wall 2–3 μ thick, closely and rather finely verrucose; aeciospores globoid or ellipsoid, 12–16 by 15–19 μ; wall colorless, thin, 1 μ or less, closely and finely verrucose.

ON CARDUACEAE:
Mesadenia atriplicifolia (L.) Raf. (*Cacalia atriplicifolia* L.), Kansas, Missouri.
Mesadenia reniformis (Muhl.) Raf. (*Cacalia reniformis* Muhl.), Wisconsin.
TYPE LOCALITY: Somers, Wisconsin, on *Mesadenia reniformis*.
DISTRIBUTION: Northeastern Wisconsin to northeastern Kansas.
EXSICCATI: Ellis & Ev. N. Am. Fungi *1811;* Rab.-Wint.-Paz. Fungi Eur. *3833a*.

80. **Aecidium Liabi** Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 576. 1913.

Aecidium Liabi Arth. Bull. Torrey Club **47**: 479. 1920.

O. Pycnia epiphyllous, somewhat loosely grouped on discolored areas, inconspicuous, dark-brown, subepidermal, ellipsoid, about 95 by 128 μ; ostiolar filaments short, about 45 μ, not projecting beyond the ostiole.

I. Aecia hypophyllous, in groups up to 8 mm. in diameter, cupulate, 0.3–0.8 mm. in diameter; peridium pale-yellow, fragile; peridial cells rhomboidal, 19–23 by 35–55 μ, considerably overlapping, the outer wall 2–5 μ thick, smooth, the inner wall thicker, 5–7 μ, closely tuberculate-verrucose; aeciospores angularly globoid, 21–26 by 26–31 μ; wall colorless, 1.5–2.5 μ thick, closely and distinctly verrucose.

ON CARDUACEAE:
Liabum sp., Veracruz.
TYPE LOCALITY: Summit of Alto Don Elias, 2100 meters, Antioquia, Colombia, on *Liabum igniarium*.
DISTRIBUTION: Southern Mexico; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 576, *f. 82*.

81. **Aecidium praecipuum** Arth. Bull. Torrey Club **47**: 480. 1920.

O. Pycnia amphigenous, in small groups about 2 mm. across, noticeable, pale-yellow becoming dark-brown, subepidermal, flattened-globoid, 110–130 μ broad by 80–95 μ high; ostiolar filaments up to 60 μ long, slightly projecting beyond the ostiole.

I. Aecia hypophyllous, crowded on spots 2–10 mm. across, short-cylindric, 0.3–0.5 mm. in diameter; peridium pale-yellow, the margin erect, erose; peridial cells irregularly oblong, 20–23 by 32–40 μ, considerably overlapping by a long projection of the outer wall, the outer wall thick, 9–11 μ, transversely striate, smooth, the inner wall thinner, 4–5.5 μ, closely and noticeably verrucose; aeciospores angularly globoid or ellipsoid, 16–19 by 19–26 μ; wall colorless, thick, 2.5–3.5 μ, very closely and inconspicuously verrucose.

ON CARDUACEAE:
Senecio praecox DC., Hidalgo, Mexico (state).
TYPE LOCALITY: Sierra de Pachuca, State of Mexico, Mexico, on *Senecio praecox*.
DISTRIBUTION: Southern Mexico.

82. **Aecidium hualtatinum** Speg. Bol. Acad. Ci. Cordoba 11: 184. 1888.

Aecidium thermarum Dietel & Neger, Bot. Jahrb. **24**: 161. 1897.
Aecidium Herrerianum Arth. Bull. Torrey Club **33**: 520. 1906.

O. Pycnia hypophyllous, in small groups 1 mm. or less across, surrounded by aecia, inconspicuous, subepidermal, almost wholly immersed, honey-yellow becoming dark-brown, flask-shaped, 80–125 μ broad by 80–110 μ high; ostiolar filaments 40–65 μ long, agglutinated into a column.

I. Aecia hypophyllous, gregarious, crowded in small groups 2–5 mm. across, cylindric, 0.2–0.5 mm. in diameter, up to 1.5 mm. long; peridium pale-yellow, the margin erect, deeply lacerate; peridial cells rhomboidal, 15–25 by 32–50 μ, occasionally up to 65 μ long, considerably overlapping, the outer wall much thickened, 9–12 μ, transversely striate, the inner wall thinner, 4–5 μ, closely rugose; aeciospores globoid, often angular, large, 23–27 by 28–34 μ; wall pale cinnamon-brown, thick, 3–4 μ, closely and finely verrucose.

ON CARDUACEAE:
Senecio salignus DC., Hidalgo.
TYPE LOCALITY: Gabel Island, Patagonia, on *Senecio* (*Hualtata*).
DISTRIBUTION: Southern Mexico; also in South America.

83. **Aecidium Pereziae** Arth. Bull. Torrey Club **45**: 153. 1918.

O. Pycnia chiefly epiphyllous, closely grouped, honey-yellow becoming brown, punctiform, noticeable, subepidermal.

I. Aecia hypophyllous, numerous, opposite the pycnia, in well defined groups 0.3–0.6 mm. across, on roseate or yellowish spots 10–15 mm. across, cupulate; peridium usually erect, the margin erose or lacerate; peridial cells easily separating, rhomboid, 19–26 by 26–37 μ, the outer wall 8–10 μ thick, faintly transversely striate, the inner wall 3–6 μ thick, moderately verrucose; aeciospores globoid, 13–18 by 16–19 μ; wall nearly or quite colorless, thin, 1–1.5 μ, very minutely verrucose, appearing smooth when wet.

ON CARDUACEAE:
Perezia sp., Mexico.
TYPE LOCALITY: Barranca, Mexico, on *Perezia* sp.
DISTRIBUTION: Known only from the type locality.

84. **Aecidium columbiense** Ellis & Ev. Erythea **1**: 206. 1893.

O. Pycnia amphigenous, scattered over the entire leaf, conspicuous, subepidermal, light-brown, flattened-globoid, 90–130 μ in diameter by 70–95 μ high; ostiolar filaments 50–100 μ long, agglutinated into a column.

I. Aecia hypophyllous, scattered over the entire leaf, arising from a diffused mycelium causing a narrowing of the leaves, cupulate, rather large, 0.3–1 mm. in diameter; peridium pale-yellow, the margin incurved, erose; peridial cells rhomboidal, 16–19 by 25–32 μ, overlapping slightly, the outer wall 5–8 μ thick, transversely striate, the inner wall 3–4 μ thick, closely and rather finely verrucose; aeciospores globoid, 16–20 by 18–21 μ; wall colorless, thin, 1–1.5 μ, closely and minutely verrucose.

ON CICHORIACEAE:
Hieracium albertinum Farr. (*H. Scouleri* A. Gray not Hook.), Washington.
Hieracium albiflorum Hook., Oregon, Washington; British Columbia.
Hieracium sp., California.
TYPE LOCALITY: British Columbia, on *Hieracium* sp.
DISTRIBUTION: Northern California to British Columbia.
EXSICCATI: Barth. N. Am. Ured. *468* in part.

EXCLUDED OR DOUBTFUL SPECIES

AECIDIUM ASPERIFOLII Schw. Schr. Nat. Ges. Leipzig **1**: 66, hyponym. 1822. Not *A. Asperifolii* Pers. No specimen extant, and the evidence is strongly indicative of some errror in determination.

AECIDIUM IPOMOEAE-PANDURANAE Schw. Schr. Nat. Ges. Leipzig **1**: 69. 1822. (*Caeoma convolvulatum* Schw. Trans. Am. Phil. Soc. II. **4**: 292, and *Aecidium convolvulatum* Schw. *l. c.* 309. 1832.) A species of the Peronosporales, *Albugo Ipomoeae-panduranae* (Schw.) Swingle.

AECIDIUM (CAEOMA) OSMUNDATUM Schw. Trans. Am. Phil. Soc. II. 4: 309. (*Caeoma Osmundatum* Schw. *l. c.* 294.) 1832. It is now determined as *Mycosyrinx Osmundae* Peck, and thought to be a member of the Ustilaginales or a Hyphomycete.

AECIDIUM RUMICIS Schw. Schr. Nat. Ges. Leipzig 1: 66, hyponym. 1822. Not *A. Rumicis* Hoffm. Said to have been on *Rumex* and *Grossularia*. No specimen preserved, and probably not a rust, but some *fungus imperfectus*, as the description says "rarely perfect."

5. PERIDERMIUM.

Aecia on gymnospermous hosts, definite, subepidermal, erumpent; peridium usually more than one cell in thickness either above or at base, or throughout, cylindric, flattened laterally, or irregularly bullate, firm or less often delicate and fragile, opening by circumscissile rupture, or less often at apex, the margin erect, frayed, the peridial cells abutted or overlapping, usually smooth without and verrucose or tuberculate within; aeciospores catenulate, one-celled, globoid or ellipsoid; wall colorless, verrucose or tuberculate, the tubercles often deciduous.

Pycnia subcuticular or subepidermal, or subcortical and more or less indefinite, with short or no ostiolar filaments.

Genus based upon a concept, and not upon a type species.

Host belonging to family Pinaceae.	
Of the genus Pinus; pycnia subepidermal.	
Aeciospores ellipsoid, the wall thick, 3–3.5 μ.	1. *P. guatemalense.*
Aeciospores oblong, the wall thin, 2–2.5 μ.	2. *P. Weirii.*
Of the genus Abies; pycnia subcuticular.	
Aecia large; peridial cells finely verrucose.	3. *P. ornamentale.*
Aecia small; peridial cells rugose.	4. *P. rugosum.*
Of the genus Picea.	
Pycnia subcuticular; mycelium annual.	5. *P. ingenuum.*
Pycnia subepidermal; mycelium perennial.	6. *P. coloradense.*
Host belonging to family Ephedraceae.	7. *P. Ephedrae.*

1. Peridermium guatemalense Arth. & Kern, Mycologia 6: 121. 1914.

Peridermium gracile Arth. & Kern, Bull. Torrey Club 33: 417. 1906. Not *P. gracile* Hark. 1884.
Peridermium floridum Hedgc. & Hahn, Mycologia 12: 194. 1920.

O. Pycnia amphigenous, numerous, subepidermal, low-conoidal, dehiscent by a longitudinal slit, 190–350 μ broad by 0.5–0.8 mm. long and 60–75 μ high.

I. Aecia amphigenous, numerous on discolored spots occupying part of the leaf, erumpent from longitudinal narrow slits; peridium flattened laterally, 0.3–0.5 by 0.5–1.5 mm. by 1–1.8 mm. high, rupturing irregularly; peridial cells broadly ellipsoid in face view, 23–29 by 30–60 μ, overlapping, the outer wall 4–6 μ thick, smooth, the inner wall 6–10 μ thick, finely and closely verrucose; aeciospores ellipsoid, 18–24 by 22–39 μ; wall 3–3.5 μ thick, closely and evenly verrucose with large deciduous tubercles.

ON PINACEAE:
Pinus filifolia Lindl., Jalisco, Oaxaca; Guatemala.
Pinus palustris Mill. (*P. australis* Michx.), Florida.
TYPE LOCALITY: Antigua, Sacatepéquez, Guatemala, on *Pinus filifolia*.
DISTRIBUTION: Central Florida, southern Mexico, and Guatemala.

2. Peridermium Weirii Arthur sp. nov.

O. Pycnia amphigenous, brownish, conspicuous, originating between the mesophyll and subepidermal layer, linear, 0.3–0.8 mm. wide by 0.6–1.3 mm. long, dehiscent by a longitudinal slit, slightly raising the leaf-surface, in section 70–96 μ high.

I. Aecia from a limited mycelium, amphigenous, sparse, on yellowish spots, erumpent from longitudinal slits, tongue-shaped, 0.5–1.3 mm. long by 0.5–0.7 mm. high; peridium white, rupturing at first along the summit, fragile; peridial cells not or slightly over-lapping, broadly oblong in face view 23–38 by 30–50 μ, the inner wall closely and rather coarsely verrucose, 4–5 μ thick, the outer wall nearly or quite smooth and thinner; aeciospores oblong, ovoid, or

broadly ellipsoid, 16–20 by 29–35 μ; wall colorless, 2–2.5 μ thick, evenly and closely verrucose with short rods about 1 μ long.

ON PINACEAE:
Pinus contorta Dougl. (*P. Murrayana* Balf.), Idaho.
Type collected at Kooskia, Idaho, July, 1917, *James R. Weir 14716*.

3. **Peridermium ornamentale** Arth. Bull Torrey Club 28: 665. 1901.

Peridermium Holwayi Sydow, Ann. Myc. 1: 19. 1903.
Aecidium ornamentale Farl. Bibl. Index 1: 71. 1905. Not *A. ornamentale* Kalchbr. 1875.

O. Pycnia amphigenous, numerous, hemispheric or flat, often confluent, inconspicuous, subcuticular, sometimes sunken into and depressing the epidermal cells, 130–175 μ broad, 25–35 μ high.

I. Aecia chiefly hypophyllous, on yellowish spots; peridium cylindroid, somewhat flattened laterally, 0.2–0.4 by 0.3–0.6 mm. by 0.5–1.5 mm. high, dehiscent at apex or irregularly; peridial cells oblong or lanceolate-oblong, overlapping, the outer wall 1–1.5 μ thick, smooth, the inner wall thicker, 2–4 μ, finely verrucose; aeciospores broadly ellipsoid, 15–18 by 18–29 μ; wall colorless, thin, 1–1.5 μ, finely and closely verrucose.

ON PINACEAE:
Abies concolor Lindl. & Gord., California, Oregon.
Abies lasiocarpa (Hook.) Nutt., Idaho, Montana, Oregon, Washington; Alberta, British Columbia.
TYPE LOCALITY: Mountains of Skamania County, Washington, on *Abies lasiocarpa*.
DISTRIBUTION: Western Montana to northern California, northward into Canada.
EXSICCATI: Barth. N. Am. Ured. *2005*.

4. **Peridermium rugosum** H. S. Jackson, sp. nov.

O. Pycnia hypophyllous, rather numerous, inconspicuous, scattered, only slightly raised above leaf-surface, subcuticular, hemispheric or lenticular, extending between the cells beneath and greatly depressing the tissues, giving the appearance of being subepidermal, 140–170 μ broad by 120–160 μ high.

I. Aecia hypophyllous, on leaves of the preceding season, in two rows on yellow spots, either side of midrib, occupying part or all of leaf, white, deep-seated, cylindric, 0.4–0.5 mm. in diameter by 0.6–1 mm. high; peridium colorless, the margin erect, erose or deeply lacerate; peridial cells polygonal or angularly ellipsoid in face view, oblong in side view, somewhat overlapping, 14–16 by 30–45 μ, the outer wall smooth 1–1.5 μ thick, the inner wall 3–4.5 μ thick, strongly rugose-verrucose, best seen in face view; aeciospores broadly ellipsoid, 16–24 by 24–32 μ; wall thin, 1.5–2 μ, colorless, closely and prominently verrucose, the markings somewhat deciduous.

ON PINACEAE:
Abies grandis Lindl., Oregon, Washington.
Type collected at Lake Cushman, Olympic Mountains, Washington, October, 1915, *Rose M. Taylor*.

5. **Peridermium ingenuum** Arthur.

Peridermium ingenuum Arth.; Rhoads, Hedgc., Bethel & Hartley, Phytopathology 8: 336, hyponym. 1918.
Aecidium ingenuum Arth. Bull. Torrey Club 46: 124. 1919.

O. Pycnia hypophyllous, discoid, inconspicuous, subcuticular, 80–130 μ broad by 40–50 μ high; ostiolar filaments wanting.

I. Aecia hypophyllous, closely packed in rows, over part or the whole leaf, often confluent; peridium nearly cylindric to tongue-shaped, 0.5–0.8 mm. high, very delicate and fragile; peridial cells in radial section narrowly oblong or linear, 10–16 by 32–42 μ, somewhat overlapping, the outer wall 1–2 μ thick, smooth, the inner wall 3–5 μ thick, closely verrucose with slender tubercles; aeciospores globoid or broadly ellipsoid, 13–16 by 16–23 μ; wall colorless, 2–3 μ thick, half the thickness being due to the close, rather fine, and somewhat deciduous tubercles.

ON PINACEAE:
Picea canadensis (Mill.) B. S. P. (*P. alba* Link, *Abies canadensis* Mill.), South Dakota, Vermont, Wisconsin.
TYPE LOCALITY: Walden, Vermont, on *Picea canadensis*.
DISTRIBUTION: Northern Vermont to the Black Hills in South Dakota.

6. Peridermium coloradense (Dietel) Arth. & Kern, Bull. Torrey Club 33: 426. 1906

Aecidium coloradense Dietel, in E. & P. Nat. Pfl. 1[1]**: 78. 1897.
Peridermium boreale Arth. & Kern, Bull. Torrey Club 33: 425. 1906.

O. Pycnia amphigenous, numerous, conspicuous, honey-yellow becoming blackish-brown, punctiform, subepidermal, in section globoid or flask-shaped, slightly protruding, 100–150 μ broad.

I. Aecia from perennial mycelium, forming witches' brooms often of great size, hypophyllous, in two irregular rows, erumpent from a lenticular opening 0.5–2.5 mm. long; peridium flattened laterally, 0.5–1.2 mm. high, dehiscent along the sides, the upper part often falling away; peridial cells oblong or ellipsoid, slightly overlapping, the outer wall 1.5–2.5 μ thick, smooth, the inner wall 3–4 μ, verrucose; aeciospores broadly ellipsoid or globoid, 16–25 by 23–35 μ; wall colorless, 2–4 μ thick, densely and rather finely verrucose.

ON PINACEAE:
Picea albertiana S. Brown, Alberta, British Columbia.
Picea canadensis (Mill.) B. S. P. (*P. alba* Link, *Abies canadensis* Mill.), Michigan, South Dakota, Washington; Saskatchewan, Yukon.
Picea Engelmanni (Parry) Engelm., Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming; Saskatchewan.
Picea excelsa (Lam.) Link (*P. abies* Karst., *P. vulgaris* Link, *Pinus Abies* L.), Washington; Manitoba.
Picea mariana (Mill.) B. S. P. (*P. nigra* Ait.), Maine, Michigan, Wisconsin; Quebec.
Picea pungens Engelm. (*P. Parryana* Sarg.), Colorado, New Mexico, South Dakota, Wyoming.
Picea rubens Sarg. (*P. rubra* Dietr.), Maine, New York.
Picea sitchensis (Bong.) Carr., Alaska.
TYPE LOCALITY: Music Pass, Sangre de Christo Range, Colorado, on *Picea Engelmanni*.
DISTRIBUTION: Across the northern part of the continent from Maine, Michigan, and South Dakota northward, and in the mountains from northern New Mexico to Oregon northward.
EXSICCATI: Barth. Fungi Columb. *2740;* Barth. N. Am. Ured. *112, 1213, 1620, 1729, 1820, 1921, 2024, 2123, 2215, 2332, 2922;* Clements, Crypt. Form. Col. *152;* Ellis & Ev. Fungi Columb. *876, 1479;* Ellis & Ev. N. Am. Fungi *2223;* Seym. & Earle, Econ. Fungi *221.*

7. Peridermium Ephedrae Cooke, Indian Forester 3: 95. 1877.

Peridermium Pini minor Berk. & Curt. Grevillea 3: 59. 1874.
Coleosporium Senecionis minus De-Toni, in Sacc. Syll. Fung. 7: 752. 1888.
Aecidium Ephedrae Dietel, in E. & P. Nat. Pfl. 1[1]**: 79. 1897.

O. Pycnia caulicolus, numerous, conspicuous, scattered irregularly, honey-yellow becoming golden-brown, subcuticular, conic, often truncate, 75–130 μ broad, 50–70 μ high.

I. Aecia caulicolous, from a perennial mycelium, numerous, scattered over slightly hypertrophied shoots; peridium cylindric, slender, 0.3–0.4 mm. in diameter, 1.5–2.5 mm. high, firm, dehiscent at apex; peridial cells oblong, abutted, the walls 4–5 μ thick, the inner wall finely verrucose; aeciospores broadly ellipsoid or globoid, 16–20 by 19–26 μ; wall colorless, thin, 1–1.5 μ, closely and finely verrucose.

ON EPHEDRACEAE:
Ephedra antisyphilitica C. Meyer, New Mexico, Texas; Lower California, San Luis Potosí.
Ephedra californica S. Wats., California; Lower California.
Ephedra nevadensis S. Wats., Arizona.
Ephedra trifurca Torr., New Mexico.
Ephedra viridis Coville, Arizona.
TYPE LOCALITY: Texas, on *Ephedra antisyphilitica*.
DISTRIBUTION: Southwestern Texas and southern California to central Mexico.
EXSICCATI: Barth. N. Am. Ured. *1621;* Rav. Fungi Car. 3: 95.

6. CAEOMA.

Aecia (or in some instances uredinia) without peridia (sometimes with paraphyses), more or less indefinite, subepidermal; aeciospores catenulate, one-celled, globoid or ellipsoid; wall colorless or yellowish, verrucose.

Pycnia subcuticular or subepidermal; ostiolar filaments wanting.
Genus based upon a concept, and not upon a type species.

1. **Caeoma dubium** C. A. Ludwig, Phytopathology **5**: 281. 1915.

O. Pycnia hypophyllous, rather numerous, scattered, noticeable, golden-brown, subepidermal, hemispheric or discoid, 80–115 μ wide by 50–80 μ high; ostiolar filaments wanting.

I. Aecia hypophyllous in two longitudinal lines, subepidermal, oblong, 0.2–0.4 mm. wide by 0.3–0.8 mm. long, not crowded, early naked, pulverulent, light-yellow when dry, ruptured epidermis evident; aeciospores broadly ellipsoid or globoid, 15–21 by 15–22 μ; wall colorless, 1.5–2.5 μ thick, often thicker above, 3–4.5 μ, prominently and very closely verrucose.

ON PINACEAE:
Tsuga heterophylla (Raf.) Sarg., Idaho, Oregon, Washington.
TYPE LOCALITY: Bainbridge Island, Kitsap County, Washington, on *Tsuga heterophylla*.
DISTRIBUTION: Northern Idaho to northwestern Washington.
EXSICCATI: Barth. Fungi Columb. *3103*; Barth. N. Am. Ured. *103*.

EXCLUDED SPECIES

CAEOMA ABERRANS Peck, Bull. Torrey Club **22**:210. 1895. On bark of living alder, Newfoundland. Not a fungus, but the natural development of lenticels under moist conditions.

CAEOMA (UREDO) BRUNNEUM Schw. Trans. Am. Phil. Soc. II. **4**:291. 1832. On an unknown plant from Philadelphia, Pennsylvania. Examination of the original material shows the spots due probably to some pathological condition and not caused by a fungus of any kind.

CAEOMA (AECIDIUM) CONVOLVULATUM Schw. Trans. Am. Phil. Soc. II. **4**:292. 1832. (*Aecidium convolvutatum* Schw. Trans. Am. Phil.Soc. II. **4**:309. 1832, *A. Ipomoeae-panduranae* Schw. Schr. Nat. Ges. Leipzig **1**:69. 1822). On *Convolvulus panduratus* L., Pennsylvania. A species of the Peronosporales, *Albugo Ipomoeae-panduranae* (Schw.) Swingle.

CAEOMA (UREDO) LOBELIAE-CARDINALIS Schw. Trans. Am. Phil. Soc. II. **4**:291. 1832. The original material consists of a leaf well covered by a brown growth of the hyphomycetous fungus, *Cercospora effusa* (Berk. & Curt.) Ellis & Ev.

CAEOMA (AECIDIUM) OSMUNDATUM Schw. Trans. Am. Phil. Soc. II. **4**:294. 1832. On *Osmunda spectabilis* Willd., New York. Not a rust, but is determined as *Mycosyrinx Osmundae* Peck, and considered to be either a member of the Ustilaginales or a Hyphomycete.

CAEOMA (UREDO) TEUCRII Schw. Trans. Am. Phil. Soc. II. **4**:291. 1832. On *Teucrium virginicum* L. (*T. canadense* L.), Bethlehem, Pennsylvania. The original material shows the hyphomycetous fungus, *Cercospora Teucrii* (Schw.) Arth. & Bisby (*C. racemosa* Ellis & Martin).

ADDITIONS AND CORRECTIONS TO UREDINALES

As the additions and corrections to *Ustilaginales* must in any event be separated by hundreds of pages from the original text, they have been deferred, to follow the corrections and additions, and the host-index, to the *Uredinales*, thus making the entire treatment of *Uredinales* consecutive.

Self-evident errors, and such as may readily be detected by reference to the bibliography or index, are not listed here. In a few cases so many additions have been made to the number of species under a genus that a new key, wholly or in part, has been substituted. Few changes have been made in the descriptions of genera or species, although in some cases a more exact statement could now be given. Unless the name of the host is erroneous it has not been changed to make it agree with recent studies, except in a few instances, even when the synonymy is antiquated. Additional localities for hosts are given near the end of the volume, except in a few instances where the range of the species is greatly extended. The statement regarding distribution has not been changed, except in rare instances, although in a number of cases added hosts have evidently extended the range.

Page

83. **UREDINALES.**

Omit the word "four" in the 20th line of the diagnosis, and make the last lines of the same sentence read as follows: "each basidium supporting four stalked or sessile basidiospores."

COLEOSPORIACEAE

By Joseph Charles Arthur

85. **COLEOSPORIACEAE.**

Substitute the following key to genera:

Basidiospores on long sterigmata. Subfamily Coleosporiatae.	
Life-cycle with all spore-forms.	1. Coleosporium.
Life-cycle with pycnia, aecia, and telia.	1*a*. Synomyces.
Life-cycle with telia only.	2. Gallowaya.
Basidiospores on short sterigmata. Subfamily Chrysopsoratae.	3. Chrysopsora.

85. **COLEOSPORIUM.**

Omit the first line in the key.

Insert, after no. 4:

Host belonging to family Oleaceae.	4*a*. *C. minutum.*
Host belonging to family Loganiaceae.	4*b*. *C. Spigeliae.*

Replace nos. 12–14 by:

Urediniospores coarsely verrucose or tuberculate.	
Urediniospores small, 22–27 μ long.	12. *C. Eupatorii.*
Urediniospores large, 26–35 μ long.	13. *C. Steviae.*
Urediniospores finely verrucose.	
Urediniospores small, 20–28 μ long.	13*a*. *C. aridum.*
Urediniospores large, 24–35 μ long.	14. *C. Laciniariae.*

Replace no. 15 by:

Of the tribe Astereae.	
Urediniospores ellipsoid; wall strongly verrucose.	15. *C. Solidaginis.*
Urediniospores oblong; wall finely verrucose.	15*a*. *C. delicatulum.*
Of the tribe Inulae.	15*b*. *C. Adenocaulonis.*

Replace no. 18 by:

Teliospores narrowed at both ends, apical outlines distinct.	
Urediniospores small, 19–27 μ long, the wall finely verrucose.	
Urediniospores ellipsoid, 14–20 μ wide, the wall 1.5 μ thick.	18. *C. Helianthi.*
Urediniospores broadly ellipsoid, 18–23 μ wide, the wall 1 μ thick.	18*a*. *C. inconspicuum.*
Urediniospores larger, oblong, 16–22 × 24–32 μ, the wall tuberculate-verrucose.	18*b*. *C. Viguierae.*

Omit no. 21.

86. Add to the key.

Host belonging to family Cichoriaceae. 25. *C. Sonchi-arvensis.*

86. **Coleosporium Bletiae.**

Omit all pertaining to this species. The record was based on scanty material from imported plants. The rust has not persisted, and seems not to have been found a second time in North America. It, therefore, can not be said to form any genuine part of the North American flora.

86. **Coleosporium ribicola.**

Add the synonym: *Peridermium ribicola* Long, Mycologia **8**: 310. 1916.

Replace the line following the synonymy by:

O. Pycnia amphigenous, scattered, low-conoidal, chestnut-brown, noticeable, subcorticular, dehiscent by a longitudinal slit, 0.5–1 mm. long by 0.3–0.5 mm. broad, about 0.1 mm. high.

I. Aecia from a limited mycelium, amphigenous, few, flattened laterally, 0.5–1 mm. long by 0.5–1.2 mm. high; peridium colorless, fragile; peridial cells slightly or not overlapping, the outer wall smooth or nearly so, the inner wall finely and moderately verrucose, the lower cells elliptic, oval or lanceolate, 16–24 by 33–50 μ, with walls 2–3 μ thick, the upper cells irregularly orbicular, nearly isodiametric, 18–30 μ in diameter, with walls 2–4 μ thick; aeciospores elliptic-oblong, oval, or obovate, 20–28 by 30–43 μ; wall colorless, 2–3 μ thick, uniformly verrucose with rather coarse irregular warts, which are tardily deciduous.

ON PINACEAE:

Caryopitys edulis (Engelm.) Small (*Pinus edulis* Engelm.), Arizona, Colorado, New Mexico.

Replace the five hosts under Grossulariaceae by:

Grossularia Cynosbati (L.) Mill. (*Ribes Cynosbati* L., *R. gracile* Michx.), Wisconsin.
Grossularia inermis (Rydb.) Cov. & Britt. (*Ribes inerme* Rydb., *R. Purpusii* Koehne, *R. vallicola* Greene), California, Colorado, New Mexico, Wyoming.
Grossularia leptantha (A. Gray) Cov. & Britt. (*Ribes leptantha* A. Gray), Colorado, New Mexico.
Grossularia pinetorum (Greene) Cov. & Britt. (*Ribes pinetorum* Greene), New Mexico.
Grossularia reclinata (L.) Mill. (*Ribes Grossularia* L., *R. Uva-crispa* L.), Colorado.
Ribes americanum Mill. (*R. floridum* L'Hér.), Colorado.
Ribes aureum Pursh (*Chrysobotrya aurea* Rydb.), Colorado.
Ribes cereum Lindl., Utah.
Ribes coloradense Coville, Utah.
Ribes inebrians Lindl. (*R. pumilum* Nutt.), Arizona, Colorado, Montana, New Mexico, South Dakota, Utah.
Ribes lacustre (Pers.) Poir. (*Limnobotrya lacustris* Rydb.), Montana.
Ribes montigenum McClatchie (*R. lentum* Cov. & Rose, *Limnobotrya montigena* Rydb.), Colorado, New Mexico.
Ribes nevadense Kellogg, California.
Ribes odoratum Wendl. (*R. longiflorum* Nutt., *Chrysobotrya odorata* Rydb.), Arizona, Colorado, New Mexico.
Ribes Wolfii Rothr., New Mexico.

Add the exsiccati: Barth. Fungi Columb. *2920, 3514, 3515, 4812;* Barth. N. Am. Ured. *305, 306, 602, 709, 1404, 1607, 1809, 1908, 1909, 2807, 3008, 3009;* Garrett, Fungi Utah. *201.*

86. **Coleosporium Mentzeliae.**

Add the host: *Mentzelia cordata* (Kell. & Curr.) Arth. (*Eucnida cordata* Kell. & Curr.), Lower California.

86. **Coleosporium Begoniae.**

Add the host: *Begonia gracilis* Kunth, Mexico (state).

87. Insert:

4a. **Coleosporium minutum** Hedgc. & Hunt, Mycologia **12**: 187. 1920.

Peridermium minutum Hedgc. & Hunt, Mycologia **9**: 242. 1917.

O. Pycnia few, solitary or wanting, tawny to chestnut-brown, 0.2–0.4 mm. wide by 0.3–0.5 mm. long.

I. Aecia largely epiphyllous, scattered, often in a single row, low and inconspicuous, flattened laterally, 0.3–0.7 mm. broad by 0.5–1.2 mm. long and 0.3–0.5 mm. high; peridia very delicate, rupturing longitudinally with finely fimbriated edges which recurve on maturity; peridial cells ovoid, ellipsoid, or rhomboid in face view, slightly overlapping or abutted, 18–28 by 35–70 μ, with walls 2–4 μ thick, the outer smooth, the inner finely verrucose; aeciospores ovoid, ellipsoid, or oblong, sometimes pointed at one end; wall colorless, 2–4 μ thick, verrucose with blunt tubercles 2.5–3.5 μ long.

ON PINACEAE:
Pinus glabra Walt., Florida.
Pinus Taeda L., Florida.

II. Uredinia hypophyllous, scattered on slightly chlorotic areas, roundish, small, 0.1–0.5 mm. across, orange-yellow fading to white, ruptured epidermis inconspicuous; urediniospores globoid or ellipsoid, 15–23 by 18–31 μ; wall 1–1.5 μ thick, thicker above, 2–8 μ, coarsely verrucose with conic tubercles.

III. Telia hypophyllous, scattered or somewhat gregarious, roundish, small, 0.2–0.4 mm. across, reddish, ruptured epidermis inconspicuous; teliospores cylindric or somewhat clavate, 18–32 by 30–70 μ, rounded or obtuse above, obtuse or narrowed below; wall colorless, thin, swelling above, 20–26 μ.

ON OLEACEAE:
Forestiera ligustrina Poir. (*Adelia ligustrina* Michx.), Florida.
TYPE LOCALITY: Gainesville, Florida, on *Pinus glabra*.
DISTRIBUTION: Central Florida.

4b. **Coleosporium Spigeliae** Arth. Bull. Torrey Club **51**: 51. 1924.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, in groups 2–6 mm. across, on slightly discolored areas, the sori 0.3–0.5 mm. apart or somewhat confluent, roundish, 0.3–0.8 mm. in diameter, soon naked, yellowish or nearly colorless, pulverulent, ruptured epidermis inconspicuous; urediniospores irregularly globoid or ellipsoid, 13–18 by 15–23 μ; wall colorless, thin, about 0.5 μ, closely and evenly verrucose.

III. Telia unknown.

ON LOGANIACEAE:
Spigelia Humboldtiana Cham. & Schlecht., Guatemala; Salvador.
TYPE LOCALITY: Near Ahuachapán, Salvador, on *Spigelia Humboldtiana*.
DISTRIBUTION: Central America.

87. **Coleosporium apocynaceum.**

Add the synonym: *Peridermium apocynaceum* Hedgc. & Hunt, Mycologia **12**: 183. 1920.

Replace the line below the synonymy by:

O. Pycnia amphigenous, in one row on each side of the leaf, conspicuous, opening by a longitudinal slit, chestnut-brown, 0.4–0.8 mm. wide by 0.6–1.4 mm. long, and 0.1–0.2 mm. high; pycniospores 2–3 by 4–7 μ.

I. Aecia chiefly hypophyllous, from a limited mycelium, flattened laterally, 0.3–0.5 mm. wide by 2–20 mm. long, and 0.3–0.5 mm. high; peridium thin, fragile, rupturing circumscissilely, the margins recurved, lacerate or fringed; peridial cells ellipsoid or cylindric, 18–33 by 25–63 μ, slightly overlapping, readily separating, the outer wall 3–6 μ thick, verrucose, the inner somewhat thinner, verrucose with cylindric tubercles 2–6 μ long; aeciospores ovoid or ellipsoid, 16–23 by 22–42 μ; wall 3–6 μ thick, verrucose with blunt tubercles 2–6 μ long.

ON PINACEAE:
Pinus caribaea Morelet (*P. Elliottii* Engelm., *P. heterophylla* Sudw.), Florida.
Pinus palustris Mill. (*P. australis* Michx.), Florida.
Pinus Taeda L., Florida.

87. **Coleosporium Plumierae.**

Replace this name by: **Coleosporium domingense** (Berk.) Arth. Am. Jour. Bot. **5**: 329. 1918.

Add the synonyms: *Uredo domingensis* Berk. Ann. Mag. Nat. Hist. II. **9**: 200. 1852. *Uredo plumieriicola* P. Henn. Hedwigia **43**: 161. 1904.

Add the hosts:

Plumiera emarginata Griseb., Cuba.
Plumiera Krugii Urban, Porto Rico.
Plumiera lutea Ruiz & Pav., Guatemala.
Plumiera obtusa L., Cuba; Bahamas; Mona Island.
Plumiera sp., Panama.

Substitute the type locality: Santo Domingo, on unknown plant [*Plumiera*, possibly *P. rubra*].

Add the exsiccati: Kellerm. Fungi Sel. Guat. *13.*

87. **Coleosporium Ipomoeae.**

Add the synonym: *Peridermium Ipomoeae* Hedgc. & Hunt, Mycologia **9**: 239. 1917.

Replace the line following the synonymy by:

O. Pycnia amphigenous, scattered or arranged in rows, on light- or yellow-green spots, dark-olivaceous, 0.1–0.35 mm. broad by 0.3–0.65 mm. long.

I. Aecia hypophyllous, usually in single rows, flattened laterally, 0.9–2.3 mm. long by 0.3–0.6 mm. high; peridial cells elliptic or rhomboid in face view, mostly overlapping, 16–26 by 18–47 μ, with walls 2–5 μ thick, the outer wall smooth, the inner wall closely and finely verrucose; aeciospores ovoid or ellipsoid, 16–20 by 22–27 μ; wall colorless, verrucose with somewhat deciduous tubercles 1–2 μ in diameter and 1–3 μ high.

ON PINACEAE:
Pinus caribaea Morelet (*P. Elliottii* Engelm., *P. heterophylla* Sudw.), Florida.
Pinus chichuachuana Engelm., Arizona.
Pinus echinata Mill. (*P. mitis* Michx.), Alabama, Arkansas, Georgia, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia.
Pinus palustris Mill. (*P. australis* Michx.), Florida, South Carolina.
Pinus rigida Mill., Maryland, Pennsylvania.
Pinus serotina Michx., Florida, South Carolina.
Pinus Taeda L., Alabama, Arkansas, Florida, Georgia, North Carolina, South Carolina, Virginia.

Add the telial hosts:

Ipomoea angustifolia Jacq., Porto Rico.
Ipomoea digitata L. (cult.), Mississippi.
Ipomoea fistulosa Mart., Salvador.
Ipomoea glabriuscula House, Guatemala.
Ipomoea hirsutula Jacq. f. (*I. mexicana* A. Gray), Guanajuato.
Ipomoea littoralis Blume, Porto Rico.
Ipomoea microsepala Benth. (*I. Nelsoni* Rose), Jalisco.
Ipomoea muricata R. & S., Guatemala.
Ipomoea mutabilis Lindl., Cuba.
Ipomoea Petri Donn.-Smith (*I. sericophylla* Peter not Meissn.), Guatemala.
Ipomoea purga Hayne, Costa Rica.
Ipomoea ruber (Vahl) Millsp., Porto Rico.
Ipomoea stolonifera (Cyrill.) Poir., Cuba; Porto Rico.
Ipomoea tiliacea (Willd.) Choisy (*I. fastigiata* Sweet), Porto Rico.
Ipomoea trichocarpa Ell. (*I. carolina* Pursh not L.), Florida, Texas.
Pharbitis barbigera (Sims) G. Don (*Ipomoea barbigera* Sims), Mississippi.
Rivea speciosa Sweet, Cuba.

Add the exsiccati: Barth. Fungi Columb. *2816, 2817, 2919, 3010, 4214, 4519, 4617, 4810;* Barth. N. Am. Ured. *304, 708, 908, 1107, 1305, 1403, 2009, 2110, 2306, 2307, 2405, 2505, 2506, 2709, 2805, 2806, 2906, 3006, 3007;* Rav. Fungi Am. *488;* Rav. Fungi Car. **4**: *99.*

88. **Coleosporium Viburni.**

Add the hosts:

Viburnum pubescens (Ait.) Pursh, Wisconsin.
Virburnum sp., Costa Rica; Guatemala.

Add: EXSICCATI: Barth. N. Am. Ured. *1006.*

88. **Coleosporium Campanulae.**

Add the host, under Pinaceae: *Pinus resinosa* Ait., Michigan.

Add the hosts, under Campanulaceae:

Campanula aparinoides Pursh, Wisconsin.
Campanula divaricata Michx., Kentucky.
Campanula persicifolia L., California.

Add the exsiccati: Barth. Fungi Columb. *2508;* Seym. & Earle, Econ. Fungi *224.*

Insert: ILLUSTRATIONS: Briosi & Cavara, Funghi Par. *103;* Ber. Deuts. Bot. Ges. **20**: *pl. 17, f. 1, 2;* Grove, Brit. Rust Fungi *f. 246;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 25, 32, f. 2*[2].

89. **Coleosporium Vernoniae.**

Replace this name by: **Coleosporium carneum** (Bosc) H. S. Jackson, Proc. Ind. Acad. **1917**: 312. 1918.

Insert the synonyms: *Tubercularia carnea* Bosc, Ges. Nat. Freunde Berlin Mag. **5**: 88. 1811. *Peridermium oblongisporium Ravenelii* Thüm. Mitth. Forstl. Vers. Oesterr. **2**: 316. 1880. *Peridermium Ravenelii* Kleb. Ber. Deuts. Bot. Ges. **8**[2]: 69. 1890. *Aecidium Ravenelii* Dietel, in E. & P. Nat. Pfl. **1**[1**]: 78. 1897. *Peridermium carneum* Seym. & Earle, Econ. Fungi *550.* 1899. *Aecidium carneum* Farlow, Bibl. Index **1**: 25. 1905. *Aecidium Vernoniae-mollis* Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 570. 1913.

Replace the line following the synonymy by:

O. Pycnia chiefly epiphyllous, one to many in a single row on either side of the leaf, at first reddish-orange, becoming chestnut-brown, 0.1–0.2 mm. wide by 0.6–1.4 mm. long, and 0.4–1 mm. high.

I. Aecia amphigenous, one to many in single rows, flattened laterally, usually irregularly rectangular or truncate, occasionally irregularly triangular in side view, 0.4–0.9 mm. wide by 1.5–8.4 mm. long, and 1.8–4 mm. high; peridium sometimes vertically striate, rupturing by a longitudinal slit, the margin irregular; peridial cells rhomboidal in cross section, usually considerably overlapping, 20–38 by 33–45 μ, the walls 4–8 μ thick, the inner wall and sometimes the outer wall closely and moderately verrucose; aeciospores obovoid or ellipsoid, 16–25 by 25–38 μ; wall thick, 3–9 μ, often thicker above, closely and coarsely verrucose.

ON PINACEAE:
Pinus caribaea Morelet (*P. Elliottii* Engelm., *P. heterophylla* Sudw.), Florida, Georgia, Mississippi.
Pinus echinata Mill. (*P. mitis* Michx.), Arkansas, Florida, Georgia, Missouri, North Carolina, South Carolina, Tennessee, Texas, Virginia.
Pinus glabra Walt., Florida.
Pinus nigra Arnold (*P. austriaca* Höss.), Ohio.
Pinus palustris Mill. (*P. australis* Michx.), Florida, Mississippi, South Carolina.
Pinus ponderosa Dougl., District of Columbia, Ohio.
Pinus rigida Mill., Connecticut, District of Columbia, Maryland, North Carolina, Ohio, Pennsylvania, Virginia.
Pinus scopulorum (Engelm.) Lemmon (*P. ponderosa scopulorum* Engelm.), Ohio.
Pinus serotina Michx., Florida, Georgia, South Carolina.
Pinus Taeda L., Alabama, Arkansas, Florida, Georgia, Mississippi, North Carolina, South Carolina, Texas, Virginia.

Omit Kansas after *Vernonia Baldwinii.*

Add the telial hosts:

Lachnorhiza piloselloides A. Rich., Cuba.
Vernonia Blodgettii Small, Florida, North Carolina, South Carolina.
Vernonia illinoensis Gleason, Indiana.
Vernonia insularis Gleason, Bahamas.
Vernonia oligantha Greene, Florida, Louisiana.
Vernonia pulchella Small, Georgia.
Vernonia tomentosa (Walt.) Ell., District of Columbia.

Change the latter part of the distribution to read: southward to Florida, the Bahamas and Texas; also in South America.

Insert: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 570, *f. 77.*

Add the exsiccati: Barth. N. Am. Ured. *1408, 1409, 1503, 1727, 1728, 1730, 1819, 1920, 2012, 2023, 2113, 2122, 2206, 2214, 2319, 2320, 2407, 2408, 2511, 2616, 2715, 2716, 2811, 2812, 3010;* Barth. Fungi Columb. *2511, 2618, 2715, 2822, 2823, 2824, 3043, 3518, 4814;* Ellis, N. Am. Fungi *1026a, b;* Rab.-Wint. Fungi Eur. *3315b;* Seym. & Earle, Econ. Fungi *224, 550.*

89. **Coleosporium Elephantopodis.**

Add the synonyms: *Peridermium intermedium* Arth. & Kern, Bull. Torrey Club **33**: 416. 1906. *Peridermium Elephantopodis* Hedgc. & Hahn, Mycologia **12**: 190. 1920.

Replace the line following the synonymy by:

O. Pycnia chiefly epiphyllous, one to many in one or two rows, at first orange-yellow, becoming golden-brown, 0.3–0.6 mm. wide by 0.3–1 mm. long, and 0.1–0.2 mm. high.

I. Aecia amphigenous, one to few in two short rows, flattened laterally, irregularly triangular or rectangular in side view, 0.3–0.9 mm. wide by 1.1–1.9 mm. long, and 1–3.6 mm. high; peridium often vertically striate, rupturing by a longitudinal slit, the margin notched; peridial cells rectangular in cross-section, slightly or not overlapping, 20–40 by 32–72 μ, the walls very thick, 6–12 μ, the inner wall closely verrucose; aeciospores globoid, obovoid, or ellipsoid, 14–24 by 20–32 μ; walls 3–6 μ thick, slightly or not at all thicker above, closely and coarsely verrucose.

ON PINACEAE:
Pinus caribaea Morelet (*P. Elliottii* Engelm., *P. heterophylla* Sudw.), Florida.
Pinus echinata Mill. (*P. mitis* Michx.), Arkansas, Georgia, Maryland, Missouri.
Pinus palustris Mill. (*P. australis* Michx.), Florida, Louisiana, Mississippi, North Carolina, South Carolina.
Pinus rigida Mill., North Carolina.
Pinus serotina Michx., Florida, South Carolina.
Pinus Taeda L., Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, Texas.

In the hosts listed under Carduaceae, place *Elephantopus scaber* L. as a synonym to *E. mollis* H.B.K., with localities, and add: *Elephantopus elatus* Bertol., Georgia, Mississippi; and *Elephantopus hypomalacus* Blake, Costa Rica; Guatemala; Salvador.

Add the exsiccati: Barth. Fungi Columb. *2815, 4518, 4616, 4809;* Barth. N. Am. Ured. *3, 906, 907, 1105, 1606, 2007, 2108, 2201, 2303, 2304, 2503, 2707, 2804, 3005;* Rab.-Wint. Fungi Eur. *3315a;* Sydow, Ured. *2391;* Thüm. Myc. Univ. *953.*

Insert: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 552, *f. 61.*

90. **Coleosporium Eupatorii.**

Add the host: *Eupatorium Oerstedianum* Benth., Costa Rica

Add: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 552, *f. 62.*

90. **Coleosporium Steviae.**

Insert the synonym: *Aecidium Carpochaetes* Sydow, Ann. Myc. **1**: 20. 1903.

Change the description of the urediniospores to read: coarsely verrucose with deciduous tubercles.

Add the hosts:

Carphochaete Grahami A. Br., San Luis Potosí.
Stevia clinopodioides Greenman, Mexico (state).
Stevia lucida Lag., Guatemala.
Stevia subpubescens Lag., Guatemala.
Stevia tomentosa Lag., Mexico (state).

Add: EXSICCATI: Barth. N. Am. Ured. *1207, 1407.*

90. Insert:

13a. **Coleosporium aridum** H. S. Jackson; Arth. Bull. Torrey Club **51**: 52. 1924.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered or gregarious, small, roundish, 0.2–0.3 mm. across, orange-yellow fading to pale-yellow, early naked, ruptured epidermis noticeable;

urediniospores globoid or ellipsoid, 16–20 by 20–28 μ; wall colorless, 1–1.5 μ thick, closely, finely, and uniformly verrucose.

III. Telia unknown.

ON CARDUACEAE:
Coleosanthus californicus (T. & G.) Kuntze (*Brickellia californica* A. Gray), California.
TYPE LOCALITY: Andreas Cañon in the Mojave desert, Riverside County, California, on *Coleosanthus californicus*.
DISTRIBUTION: Known only from the type locality.

90. **Coleosporium Laciniariae.**

Insert the synonym: *Peridermium fragile* Hedgc. & Hunt, Mycologia **9**: 241. 1917.

Replace the first line of the description by:

O. Pycnia amphigenous, few or singly on somewhat paler spots, 0.4–0.5 by 0.5–0.9 mm., dark-olive to blackish.

I. Aecia hypophyllous, solitary or few, small and inconspicuous, 0.4–0.5 mm. high by 0.8–2 mm. long; peridium flattened laterally, rupturing longitudinally with irregularly notched edges; peridial cells ovoid or ellipsoid in face view, frequently pointed at both ends, somewhat overlapping, 17–25 by 37–46 μ, the wall 4–8 μ, the inner wall verrucose with crowded papillae 1.1–1.9 by 4.1–5.6 μ; aeciospores ovoid or ellipsoid, 18–22 by 25–34 μ; wall 2–3 μ thick, closely verrucose with irregularly arranged rows of more or less deciduous tubercles 1.7–3.2 μ long.

ON PINACEAE:
Pinus palustris Mill. (*P. australis* Michx.), Florida.
Pinus rigida Mill., District of Columbia, New Jersey.

Add the hosts, under Carduaceae:

Laciniaria elegans (Walt.) Kuntze, Florida.
Laciniaria elegantula Greene, Alabama.
Laciniaria gracilis (Pursh) Kuntze, Florida.
Laciniaria laxa Small, Florida.
Laciniaria Nashii Small, Florida.
Laciniaria pilosa (Ait.) Heller, Georgia.
Laciniaria scariosa (L.) Hill (*Liatris squarrulosa* Michx.), Arkansas, Georgia, Tennessee.
Laciniaria tenuifolia (Nutt.) Kuntze, Florida.

Add: EXSICCATI: Barth. Fungi Columb. *2818;* Barth. N. Am. Ured. *2406*, *2507*.

90. **Coleosporium Solidaginis.**

Add the synonyms: *Peridermium Pini-densiflorae* P. Henn. Bot. Jahrb. **28**: 263. 1900. *Peridermium montanum* Arth. & Kern, Bull Torrey Club **33**: 413. 1906. *Coleosporium Pini-Asteris* Orishimo, Bot. Mag. Tokyo **24**: 4. 1910. *Coleosporium Asterum* Sydow, Ann. Myc. **12**: 109. 1914.

Add the hosts, under Pinaceae:

Pinus Banksiana Lamb. (*P. divaricata* Sudw.), Wisconsin; Manitoba.
Pinus contorta Dougl. (*P. Murrayana* Balf.), Colorado, Montana, Oregon, Washington; Alberta.
Pinus echinata Mill. (*P. mitis* Michx.), Alabama, Arkansas, Delaware, District of Columbia, Georgia, Maryland, Mississippi, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia.
Pinus pungens Michx. f., Maryland, Pennsylvania.
Pinus resinosa Ait., Minnesota, New Hampshire, Pennsylvania, South Carolina, Vermont.
Pinus scopulorum (Engelm.) Lemmon (*P. ponderosa scopulorum* Engelm.), Montana.
Pinus Taeda L., Alabama, Georgia, North Carolina, South Carolina, Virginia.
Pinus Thunbergii Parl., Maryland.
Pinus virginiana Mill. (*P. inops* Soland.), Pennsylvania, Virginia.

Omit, under Carduaceae, the two species of *Euthamia* and their distribution, and also Wisconsin after *Aster Eatoni*, and add:

Aster acuminatus Michx., Maryland, New York.
Aster adscendens Lindl., Colorado, Idaho.
Aster amplissimus Greene, Oregon.
Aster commutatus (T. & G.) A. Gray (*A. incanopilosus* Sheldon), Nebraska.
Aster crassulus Rydb., Colorado.

Aster Cusickii A. Gray, Oregon.
Aster Douglasii Lindl., Montana, Oregon, Washington.
Aster foliaceus Lindl., Washington.
Aster Fremontii (T. & G.) A. Gray, Montana.
Aster Geyeri (A. Gray) Howell, Colorado, Idaho, Washington.
Aster Hallii A. Gray, Oregon.
Aster hirsuticaulis Lindl., North Carolina.
Aster junceus Ait., Ontario.
Aster kentuckyensis Small, Alabama.
Aster Lowrieanus Porter, Virginia.
Aster Menziesii Lindl., California.
Aster meritus A. Nelson, Montana.
Aster Porteri A. Gray, Colorado.
Aster Pringlei (A. Gray) Britt., Pennsylvania.
Aster Tweedyi Rydb., Colorado.
Brachyactis frondosa (Nutt.) A. Gray (*Aster frondosus* T. & G.), Colorado.
Chrysopsis caudata Rydb., Colorado.
Chrysopsis hirsutissima Greene, Colorado.
Chrysopsis horrida Rydb., Colorado.
Chrysopsis mariana (L.) Ell., Florida.
Chrysopsis scabrella T. & G., Florida.
Chrysopsis villosa (Pursh) Nutt., Colorado, Nebraska.
Erigeron inornatus A. Gray, California.
Erigeron peregrinus (Pursh) Greene, Alaska.
Grindelia oregana A. Gray, Washington.
Grindelia squarrosa (Pursh) Dunal, Colorado, Wisconsin.
Gutierrezia texana (DC.) T. & G., Texas.
Heterotheca subaxillaris (Lam.) Britt. & Rusby, Florida.
Machaeranthera viscosula Rydb., Colorado.
Oligoneuron canescens Rydb. (*Solidago rigida humilis* Porter); Nebraska.
Psilactis asteroides A. Gray, New Mexico.
Pyrrocoma lanceolata (Hook.) Greene (*Aplopappus lanceolatus* T. & G.), Montana.
Solidago altissima L., Indiana, Iowa, Kentucky, Nebraska, New Jersey, Pennsylvania, Tennessee, Wisconsin.
Solidago austrina Small, Georgia.
Solidago Boottii Hook., Tennessee.
Solidago brachyphylla Chapman, Georgia.
Solidago caurina Piper, Oregon.
Solidago celtidifolia Small, Arkansas.
Solidago Chapmanii A. Gray, Florida.
Solidago concinna A. Nelson, Colorado, Montana.
Solidago confinis A. Gray, California.
Solidago Curtisii T. & G., North Carolina, Tennessee, Virginia.
Solidago decumbens Greene, Colorado.
Solidago elongata Nutt., Idaho, Oregon, Washington.
Solidago erecta Pursh (*S. speciosa angustata* T. & G.), District of Columbia, Georgia, Indiana, Maryland, New Jersey, New York, North Carolina, Tennessee, Virginia.
Solidago fistulosa Mill., Florida, Mississippi, New Jersey.
Solidago gilvocanescens (Rydb.) Smyth, North Dakota, South Dakota.
Solidago hispida Muhl., Arkansas, Georgia, Michigan, North Carolina.
Solidago mollis Bartl., Nebraska.
Solidago multiradiata Ait., Manitoba.
Solidago odora Ait., Georgia, Massachusetts, New Jersey, North Carolina, Virginia.
Solidago oreophila Rydb., Colorado.
Solidago petiolaris Ait., Arkansas, Missouri.
Solidago radula Nutt., Missouri.
Solidago rigidiuscula (T. & G.) Porter, Arkansas.
Solidago rupestris Raf., North Carolina, Virginia.
Solidago speciosa Nutt., Maryland, New York, North Carolina, Tennessee, Virginia.
Solidago squarrosa Muhl., Maryland, New Jersey, New York, Pennsylvania, West Virginia.
Solidago stricta Ait., Florida.
Solidago tortifolia Ell., Florida.
Solidago uniligulata (DC.) Porter, Maine.
Solidago Vaseyi Heller, Tennessee.

Insert: ILLUSTRATIONS: Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 26, 27, 32, f. 1'.*

Omit from the exsiccati " Carleton, Ured. Am. *44*," and add: Barth. Fungi Columb. *2382, 2510, 2541, 2616, 2617, 2713, 2714, 2819, 2820, 2821, 2921, 2922, 2923, 3011, 3012, 3013, 3217, 3311, 3418, 3516, 3517, 3614, 3905, 3906, 4011, 4112, 4113, 4215, 4312, 4313, 4520, 4618, 4813, 4911, 4912, 5008, 5009, 5074;* Barth. N. Am. Ured. *5, 105, 209, 307, 308, 404, 405, 406, 603, 604, 710, 711, 712, 802, 909, 1005, 1108, 1205, 1206, 1306, 1307, 1405, 1406, 1608, 1708, 1709, 1810, 1811, 1812, 1910, 2010, 2011, 2112, 2203, 2204, 2205, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2508, 2509, 2510, 2615, 2710,*

2711, 2712, 2713, 2714, 2808, 2809, 2810, 2907, 2908, 2909; Brenckle, Fungi Dak. 77, *276, 276a, 305, 305a, 355, 355a;* D. Griff. W. Am. Fungi *173;* Rav. Fungi Car. 3: *96;* Thaxter, Rel. Farl. *215a;* Seym. & Earle, Econ. Fungi *480;* Sydow, Ured. *2448;* Thüm. Myc. Univ. *1443.*

92. Insert:

15a. **Coleosporium delicatulum** (Arth. & Kern) Hedgc. & Long, Phytopathology 3: 250. 1913.

Peridermium delicatulum Arth. & Kern, Bull. Torrey Club 33: 412. 1906.

O. Pycnia amphigenous, few, scattered, conspicuous, brownish, dehiscent by a longitudinal slit, deep-seated, large, 0.3–0.4 mm. broad by 0.5–1 mm. long, low-conoidal, 80–100 μ high.

I. Aecia amphigenous, from a limited mycelium, numerous, in rows on discolored spots occupying part of a leaf, erumpent from longitudinal slits 1–5 mm. long extending along one side, the epidermis recurved; peridium delicate, inconspicuous, scarcely protruding above the ruptured epidermis; peridial cells isodiametric, slightly or not overlapping, 20–25 μ long, the walls transversely striate, the inner wall 4–5 μ thick, finely verrucose, the outer wall slightly thinner, smooth; aeciospores ovoid or cuboidal, 19–21 by 21–28 μ; wall colorless, 2.5–3 μ thick, finely verrucose.

On Pinaceae:
Pinus rigida Mill., Connecticut, Massachusetts.
Pinus Taeda L., Florida, Texas.

II. Uredinia amphigenous, irregularly scattered, round, 0.3–0.5 mm. in diameter, soon naked, yellow or orange-yellow fading to white, ruptured epidermis inconspicuous; urediniospores oblong or ovoid, 13–19 by 20–30 μ; wall thin, about 1 μ, closely and finely verrucose.

III. Telia amphigenous, scattered irregularly, single or in confluent groups of three or four, 0.3–0.5 mm. across, elevated, waxy, at first reddish-orange; teliospores with wall swelling to 25–30 μ above; contents orange-yellow fading to colorless, terete, 16–26 by 60–90 μ, rounded or truncate above and below.

On Carduaceae:
Euthamia graminifolia (L.) Nutt. (*Solidago lanceolata* L.), Connecticut, Delaware, District of Columbia, Indiana, Kansas, Maine, Massachusetts, Missouri, New Hampshire, New Jersey, New York, Pennsylvania, West Virginia.
Euthamia gymnospermoides Greene (*Solidago gymnospermoides* Fernald), Texas.
Euthamia leptocephala (T. & G.) Greene (*Solidago leptocephala* T. & G.), Texas.
Euthamia minor (Michx.) Greene (*Solidago minor* Fernald), Florida.
Euthamia tenuifolia (Pursh) Greene (*Solidago tenuifolia* Pursh, *E. caroliniana* Greene), Florida, New Hampshire, New York.
Type locality: St. Augustine, Florida, on *Pinus* [*Taeda* L.].
Distribution: Maine to eastern Kansas, and southward to Florida and eastern Texas.
Exsiccati: Barth. Fungi Columb. *2509;* Barth. N. Am. Ured. *517, 720, 2302, 3004;* Carleton, Ured. Am. *44;* Thaxter, Rel. Farl. *215b.*

15b. **Coleosporium Adenocaulonis** H. S. Jackson, Brooklyn Bot. Gard. Mem. 1: 202. 1918.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, few, scattered on conspicuous angular yellowish spots, small, 0.1–0.2 mm. across, early naked, orange-yellow fading to whitish, pulverulent, ruptured epidermis conspicuous; urediniospores globoid or ellipsoid, 18–24 by 23–26 μ; wall light golden-brown or colorless, 2–3 μ thick, prominently and moderately verrucose.

III. Telia unknown.

On Carduaceae:
Adenocaulon bicolor Hook., Oregon.
Type locality: Corvallis, Oregon, on *Adenocaulon bicolor.*
Distribution: Known only from the type locality.

92. **Coleosporium Madiae.**

Add the synonyms: *Coleosporium arnicale* Arth. N. Am. Flora **7**: 94. 1907. *Peridermium californicum* Arth. & Kern, Mycologia **6**: 118. 1914.

Replace the first line below the synonymy by:

O. Pycnia amphigenous, large, 0.4–0.7 mm. broad by 0.5–1 mm. long, low-conoidal, about 90 μ high.

I. Aecia amphigenous, few, scattered on scarcely discolored spots, large, tongue-shaped, 0.7–1.5 mm. long by 0.8–1.2 mm. high; peridial cells ellipsoid in face view, usually rounded at both ends, overlapping, 29–35 by 50–87 μ, the walls colorless, 5–7 μ thick, the inner wall rather coarsely and closely verrucose with slightly irregular papillae; aeciospores broadly ellipsoid, 25–29 by 40–45 μ; wall 3–4.5 μ thick, moderately and rather coarsely verrucose.

On PINACEAE:
Pinus radiata D. Don (*P. insignis* Dougl.), California.

Add the telial hosts:

Centromadia pungens (H. & A.) Greene (*Hemizonia pungens* T. & G.), California.
Harpaecarpus exiguus (Smith) A. Gray (*Madia exigua* Greene), Oregon.
?*Hemizonella Durandi* A. Gray (*Hemizonia Durandi* A. Gray), Washington.
Hemizonia citriodora (Greene)A. Gray (*Madia citriodora* Greene), Oregon.
Hemizonia congesta DC., California.
Madaria elegans (D. Don) DC. (*Madia elegans* D. Don), California.
Madia glomerata Hook., Oregon.
Madia ramosa Piper, Oregon.

Add the exsiccati: Barth. Fungi Columb. *4714, 4811, 4910;* Barth. N. Am. Ured. *1707, 1808, 2111.*

93. **Coleosporium Helianthi.**

Add the synonym: *Peridermium Helianthi* Hedgc. & Hunt, Mycologia **9**: 240. 1917.

Omit *Coleosporium Viguierae* and *C. Verbesinae,* with their citations.

Replace the first line below the synonymy by:

O. Pycnia amphigenous, few or solitary, brownish-olive, applanate, large, 0.2–0.5 mm. wide by 0.3–0.6 mm. long.

I. Aecia amphigenous, few in open groups or solitary, on slightly discolored areas, flattened becoming tongue-shaped, 0.5–1.2 mm. long by 0.8–1.8 mm. high, rupturing longitudinally with coarsely toothed edges; peridial cells ovoid or ellipsoid in face view, 13–25 by 27–43 μ, rhombic or rhomboidal in section, 26–29 by 30–45 μ, the wall colorless, the outer wall 3–4 μ thick, transversely striate, smooth, the inner wall slightly thicker, 4–5 μ, rather evenly and finely verrucose; aeciospores globoid or broadly ellipsoid, sometimes pointed below, 15–20 by 20–28 μ; wall colorless, 2.5–3.5 μ thick, rather uniformly and evenly verrucose, the tubercles 1–2 μ long.

On PINACEAE:
Pinus virginiana Mill. (*P. inops* Soland.), North Carolina, South Carolina, Virginia.

Omit all species of *Coreopsis, Verbesina,* and *Viguiera* with their distributions, and add the telial hosts:

Helianthus divaricatus L., New York, North Carolina, Tennessee.
Helianthus hirsutus Raf., West Virginia.
Helianthus microcephalus T. & G., Georgia, Maryland, South Carolina, Tennessee.
Helianthus occidentalis Riddell, Louisiana.
Helianthus scaberrimus Ell., Oklahoma.
Helianthus strumosus L., Missouri.
Helianthus tuberosus L., Illinois.

Change the distribution to read: Northern Louisiana to South Carolina and northward to central Illinois and southern New York.

Omit from the exsiccati " Seym. & Earle, Econ. Fungi Suppl. *B22.*"

Add the exsiccati: Barth. Fungi Columb. *4909;* Barth. N. Am. Ured. *1106, 1402, 2008, 2202, 2305, 2504, 2614, 2708.*

93. Insert:

18a. **Coleosporium inconspicuum** (Long) Hedgc. & Long, Phytopathology **3**: 250. 1913.

Peridermium inconspicuum Long, Mycologia **4**: 283. 1912.

O. Pycnia chiefly hypophyllous, few or many, low-conoidal, dehiscent by a longitudinal slit, 0.2–0.3 mm. broad, 0.3–0.7 mm. long by 85–120 μ high.

I. Aecia amphigenous from a limited mycelium, one to several on slightly discolored spots, erumpent from a narrow slit, flattened laterally, 0.3–0.7 mm. long by 0.3–0.9 mm. high; peridium colorless, fragile, evanescent; peridial cells oblong or lanceolate-oblong in face view, somewhat overlapping, 19–27 by 32–55 μ in face view, the wall 3–4 μ thick, the inner wall closely verrucose; aeciospores ellipsoid or obovoid, 15–18 by 21–30 μ; wall colorless, thin, 2–3 μ, minutely verrucose.

ON PINACEAE:
Pinus echinata Mill. (*P. mitis* Michx.), Georgia.
Pinus palustris Mill. (*P. australis* Michx.), South Carolina.
Pinus virginiana Mill. (*P. inops* Soland.), District of Columbia, Kentucky, Maryland, Virginia.

II. Uredinia hypophyllous, scattered irregularly, round, 0.3–0.5 mm. in diameter, golden-yellow fading to white, soon naked, pulverulent, ruptured epidermis noticeable; urediniospores broadly ellipsoid or globoid, 19–23 by 23–26 μ; wall thin, 1 μ, finely and closely verrucose.

III. Telia hypophyllous, scattered irregularly, roundish, 0.3–0.5 mm. across, orange-yellow fading to pale-yellow, pulvinate, waxy; teliospores with wall swelling 20–29 μ thick above, outline of the spores distinct, the contents bright orange-red fading to colorless, oblong or somewhat clavate, 16–24 by 65–75 μ, obtuse or somewhat narrowed above, usually acuminate below.

ON CARDUACEAE:
Coreopsis major Walt., North Carolina, South Carolina, Tennessee, Virginia.
TYPE LOCALITY: Glen Echo, Maryland, on *Pinus virginiana*.
DISTRIBUTION: The Alleghany Mountains and eastward from Maryland to South Carolina.
EXSICCATI: Barth. N. Am. Ured. *2109*, *2404*.

18b. **Coleosporium Viguierae** Dietel & Holway; Holway, Bot. Gaz. **24**: 34. 1897.

Coleosporium Verbesinae Dietel & Holway; Holway, Bot. Gaz. **31**: 337. 1901.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous, scattered or gregarious, on discolored spots 0.5–1 cm. across, small, round, 0.5–1 mm. in diameter, pulverulent, yellowish fading to whitish, ruptured epidermis usually conspicuous; urediniospores ellipsoid or oblong, 16–22 by 24–32 μ; wall colorless, thin, 1–1.5 μ, rather coarsely tuberculate-verrucose, tubercles longer on one end and side of spore, usually with a smooth spot near one end.

II. Telia hypophyllous, scattered irregularly or sometimes gregarious, often crowded, 0.5–1 mm. across, orange-yellow fading to pale-yellow, pulvinate; teliospores with apical wall swelling 20–30 μ, oblong or clavate, 16–22 by 50–70 μ, rounded at both ends or truncate above.

ON CARDUACEAE:
Phaethusa laciniata (Poir.) Small (*Verbesina laciniata* Poir.), Florida.
Verbesina apleura Blake, Guatemala.
Verbesina gigantea Jacq., Guatemala; Jamaica.
Verbesina guatemalensis Rob. & Greenm., Salvador.
Verbesina Holwayi B. L. Robinson, Guatemala.
Verbesina montanoifolia Rob. & Greenm., Michoacan.
Verbesina myriocephala Schultz-Bip., Costa Rica.
Verbesina nicaraguensis Benth., Costa Rica.
Verbesina perymenioides Schultz-Bip., Guatemala.
Verbesina pinnatifida Cav., Jalisco.
Verbesina scabriuscula Blake, Guatemala.
Verbesina sublobata Benth., Guatemala.
Verbesina texana Buckl., Texas.
Verbesina turbacensis H.B.K., Guatemala.
Verbesina virgata Cav., Oaxaca, Mexico (state), Morelos.
Viguiera helianthoides H.B.K. (*V. dentata* Spreng.), Hidalgo, Mexico (state), Puebla.

Ximenesia exauriculata (Rob. & Greenm.) Rydb., Arizona.
Zexmenia helianthoides A. Gray, Jalisco.
TYPE LOCALITY: Near Tula, Hidalgo, Mexico, on *Viguiera helianthoides*.
DISTRIBUTION: Southern Florida and southern Texas, southward through Mexico and Central America, and in Jamaica.
EXSICCATI: Barth. N. Am. Ured. *4, 539;* Sydow, Fungi Exot. *115.*

93. **Coleosporium Terebinthinaceae.**

Add the synonym: *Peridermium Terebinthinaceae* Hedgc. & Hunt, Mycologia **9**: 240. 1917.

Replace the line below the synonymy by:

O. Pycnia amphigenous, solitary or few, usually in short rows, blackish-brown, flattened, 0.2–0.3 mm. broad by 0.3–0.6 mm. long, in section about 128 μ in diameter by 55 μ high.

I. Aecia hypophyllous, solitary or few on scarcely discolored spots, flattened laterally, 0.7–1.3 mm. long by 1.1–2 mm. high, opening by a longitudinal rupture, leaving erose edges; peridial cells colorless, in face view ovoid or ellipsoid, often angular, 19–30 by 39–66 μ, in section rhomboidal, slightly or not overlapping, the walls colorless, the outer wall 1.5–2 μ thick, smooth, the inner wall 5–7 μ thick, closely and strongly verrucose, with somewhat deciduous papillae 2.5–4 μ long; aeciospores ellipsoid or ovoid, 18–22 by 29–36 μ; wall colorless, 2–3.5 μ thick, closely and strongly verrucose, with somewhat deciduous papillae 1–2.5 μ long.

ON PINACEAE:
Pinus echinata Mill. (*P. mitis* Michx.), Alabama, Georgia, North Carolina, South Carolina.
Pinus serotina Michx., South Carolina.
Pinus Taeda L., Alabama, South Carolina.

Add the telial host: *Silphium perfoliatum* L., Indiana, Missouri.

Add: EXSICCATI: Barth. Fungi Columb. *4619;* Barth. N. Am. Ured. *713, 1109, 2318;* Seym. & Earle, Econ. Fungi Suppl. *B22.*

94. **Coleosporium arnicale.**

Omit all pertaining to this species, as it is represented under *C. Madiae*, the host being erroneously determined.

94. **Coleosporium paraphysatum.**

Add the hosts:

Liabum hypochlorum Blake, Guatemala.
Liabum sublobatum B. L. Robinson, Guatemala.

94. **Coleosporium occidentale.**

Add the hosts:

Senecio aronicoides DC., California.
Senecio canus Hook., Wyoming.
Senecio Fendleri A. Gray (*S. Nelsoni* Rydb., *S. rosulatus* Rydb.), Colorado, Wyoming.
Senecio serra Hook., Wyoming.
Senecio triangularis Hook., Montana, Oregon.
Senecio uintahensis (A. Nelson) Greenman, Utah.

95. Insert:

25. **Coleosporium Sonchi-arvensis** (Pers.) Lév.; Berk. Outl. Brit. Fungol. 333. 1860.

Uredo Sonchi-arvensis Pers. Syn. Fung. 217. 1801.
Uredo tuberculosa Schum. Enum. Pl. Saell. **2**: 229. 1803.
Uredo Sonchi Schum. Enum. Pl. Saell. **2**: 229. 1803.
Uredo fulva Schum. Enum. Pl. Saell. **2**: 229. 1803.
Coleosporium Sonchi Schroet. Beitr. Biol. Pfl. **3**: 57. 1879.
Peridermium Fischeri Kleb. Zeits. Pflanzenkr. **5**: 71. 1895.

O. Pycnia chiefly epiphyllous, 0.5–1 mm. long, 0.2–0.3 mm. broad.

I. Aecia amphigenous, few, flattened laterally, 0.5–2 mm. long, 0.5–1 mm. high, irregularly dehiscent; peridial cells in face view broadly ellipsoid, 18–34 by 35–65 μ,

slightly overlapping, the outer wall smooth, but appearing punctate, the inner wall finely verrucose; aeciospores broadly ellipsoid, more or less angular, 18–25 by 25–35 μ; wall colorless, rather thin, about 2 μ thick, closely and moderately verrucose.

ON PINACEAE:
Pinus sylvestris L., Wisconsin.

II. Uredinia hypophyllous, irregularly scattered, round or oblong, 0.4–0.6 mm. across, soon naked, pulverulent, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 14–21 by 18–30 μ; wall colorless, about 1.5 μ thick, finely and densely verrucose.

III. Telia hypophyllous, scattered or somewhat aggregate and confluent, waxy, roundish, 0.4–0.6 mm. in diameter; teliospores cylindric-clavate, 15–18 by 60–100 μ, rounded above, rounded or somewhat narrowed below; wall colorless, thin, thickened above up to 18 μ.

ON CICHORIACEAE:
Sonchus asper (L.) Hill, Wisconsin.
TYPE LOCALITY: Europe, on *Sonchus arvensis*.
DISTRIBUTION: Locally in Wisconsin; also in Europe.
ILLUSTRATIONS: Cooke, Rust Smut Mildew *pl. 8, f. 178, 179;* DeBary, Brandpilze *pl. 2, f. 10;* Grove, Brit. Rust Fungi *f. 244.*

95. Insert:

1a. SYNOMYCES Arthur, gen. nov.

Cycle of development includes (pycnia ?), aecia and telia; autoecious. All sori subepidermal.

Aecia erumpent, definite. Peridium colorless with verrucose walls. Aeciospores globoid to oblong, with colorless wall, strongly verrucose with somewhat deciduous tubercles.

Telia indehiscent except through weathering, waxy, roundish. Teliospores sessile, one-celled (by early division of the contents appearing four-celled); wall smooth, colorless, thickened and gelatinous above.

Type species, *Coleosporium Reichei* Dietel (on *Stevia* sp.).

1. **Synomyces Reichei** (Dietel) Arthur.

Coleosporium Reichei Dietel, Ann. Myc. **21**: 341. 1923.

O. Pycnia unknown.

I. Aecia hypophyllous, numerous, scattered singly or in small groups of two to six, cylindric, 0.2–0.5 mm. high; peridium firm, whitish, margin lacerate; peridial cells oblong or rhombic, 25–30 by 30–45 μ, slightly overlapping, the outer wall thin, minutely verrucose, the inner wall 6–8 μ thick, densely and prominently verrucose-tuberculate; aeciospores globoid or depressed-globoid, 20–29 by 23–31 μ; wall colorless, thin, 1 μ, densely verrucose by columnar projections to 5 μ long on one side, shorter to nearly smooth on the opposite side.

III. Telia hypophyllous, scattered or in small irregular groups, minute, waxy, reddish; teliospores cylindric or clavate, 22–25 by 70–90 μ; wall golden-brown, thin, 1 μ or less, swelling above to 25 μ.

ON CARDUACEAE:
Stevia sp., Mexico (state).
TYPE LOCALITY: Near Tres Marias, Mexico, on *Stevia* sp.
DISTRIBUTION: Known only from the type locality.

95. **Gallowaya Pini.**

Reduce this name to synonymy, and substitute: **Gallowaya pinicola** Arth. Bull. Torrey Club **48**: 36. 1921.

Add to the synonym as given: Not *C. Pini* Lagerh. 1889.

95. Insert:

3. CHRYSOPSORA Lagerh. Ber. Deuts. Bot. Ges. **9**: 345. 1891.

Cycle of development includes pycnia and telia, both being subepidermal.

Pycnia globoid or flask-shaped, with slightly protruding or obsolescent ostiolar filaments.

Telia dehiscent, in concentric circles, elevated. Teliospores pedicellate, two-celled (by subsequent division of the contents appearing eight-celled); wall smooth, colorless, gelatinous, of uniform thickness.

Type species, *Chrysopsora Gynoxidis* Lagerh. (on *Gynoxis pulchella*).

1. **Chrysopsora Cestri** (Dietel & Henn.) Arth. Bull. Torrey Club **51**: 53. 1924.

Puccinia Cestri Dietel & Henn.; P. Henn. Hedwigia **41**: 295. 1902.

O. Pycnia epiphyllous, in small, crowded groups, usually 5–10 each, hemispheric in surface view, globoid in section, prominent, large, 200–225 μ in diameter; ostiolar filaments none.

III. Telia hypophyllous, in crowded annular groups 2–10 mm. in diameter, forming concentric circles, each ring 0.5–1 mm. thick, soon naked, orange-yellow fading to white, somewhat waxy and finely pulverulent by the abundant production of basidiospores, ruptured epidermis noticeable; teliospores cylindric, 10–15 by 32–100 μ, not adhering laterally, rounded above; wall colorless, uniformly thin, about 1 μ, smooth; pedicel colorless, of same diameter as spore, or slightly narrower, 30–50 μ long.

ON SOLANACEAE:
Cestrum aurantiacum Lindl., Panama.
Cestrum sp., Costa Rica.
TYPE LOCALITY: Serra da Cantareira, São Paulo, Brazil, on *Cestrum* sp.
DISTRIBUTION: Central America; also in South America.

UREDINACEAE

BY JOSEPH CHARLES ARTHUR

97. **UREDINACEAE.**

In the first line after the words " definite crust or column " insert " (except in *Olivea*) "; and in the third line before the word " sessile " insert " or superficial (*Olivea*)."

97. Substitute the following key to genera:

Pycnia and other sori subcuticular or originating between the epidermis and mesophyll; telia indehiscent; teliospores compacted into dense layers forming a crust; aecia when present without peridium; uredinia when present without peridium, or with an imperfect one of paraphyses, the spores borne singly on pedicels. Subfamily UREDINATAE.
  Teliospores in a single layer.
    Life-cycle with all spore-forms, so far as known.
      Uredinia with paraphyses intermixed with the spores. 1. MELAMPSORA.
      Uredinia with paraphyses forming an imperfect peridium. 1*a*. APLOPSORA.
    Life-cycle only with telia. 1*b*. NECIUM.
  Teliospores in more than one layer. 2. PHAKOPSORA.

Pycnia, uredinia, and telia subcuticular, aecia originating between the epidermis and mesophyll; teliospores following in the uredinial sori, arising from a somewhat branched hymenium, delicate, not compacted, one-celled; aecia when present without peridium, but with protective hyphae and host-tissue; uredinia with strongly incurved paraphyses forming a cage, spores borne singly on pedicels. Subfamily OLIVEATAE. 3. OLIVEA.

Pycnia subcuticular, other sori originating between the epidermis and mesophyll, or the telia within the epidermal cells; telia indehiscent, teliospores divided by vertical partitions or one-celled, forming imperfect layers; aecia when present with cylindric peridium, rupturing irregularly above; uredinia when present usually with peridium, spores borne singly on pedicels, or apparently so. Subfamily PUCCINIASTRATAE.
  Life-cycle with all spore-forms.

Teliospore-wall colored.
Urediniospores echinulate throughout. 4. PUCCINIASTRUM.
Urediniospores echinulate except apex. 5. MELAMPSORIDIUM.
Teliospore-wall colorless; urediniospores echinulate. 6. MELAMPSORELLA.
Life-cycle with pycnia, aecia, and telia; teliospore-wall colored. 7. CALYPTOSPORA.
Pycnia subcuticular or subepidermal, other sori originating between the epidermis and mesophyll, or the telia within the epidermal cells or between cells of mesophyll; telia indehiscent, teliospores divided by vertical partitions or one-celled, forming imperfect layers; aecia with cylindric peridium, rupturing above, aeciospores colorless; uredinia dimorphic, usually with peridium, spores either somewhat catenulate or borne singly on pedicels, or apparently so. Subfamily UREDINOPSATAE.
Pycnia subcuticular, but often depressed and seemingly subepidermal; urediniospores in one form pointed, in the other obovate. 8. UREDINOPSIS.
Pycnia subepidermal.
Urediniospores either pointed and smooth, or obovate and spinulose. 9. MILESIA.
Urediniospores in both forms obovate, smooth or verrucose. 10. HYALOPSORA.
Pycnia and other sori originating beneath the epidermis; telia erumpent, teliospores catenulate, with colorless wall, compacted laterally; aecia when present with somewhat flattened peridium, rupturing apically; uredinia when present with delicate peridium (rarely wanting) and catenulate spores. Subfamily CHRYSOMYXATAE.
Life-cycle with all spore-forms. 11. MELAMPSOROPSIS.
Life-cycle with telia and possibly pycnia. 11*a*. CHRYSOMYXA.
Pycnia and other sori originating beneath the epidermis; telia erumpent, with or without peridia, teliospores catenulate, compacted laterally, often adhering and extruded into long columns, one-celled, or two-celled by transverse septum, wall colorless or colored; aecia when present with inflated peridium, more than one cell thick above; uredinia when present with peridium, spores borne singly on pedicels. Subfamily CRONARTIATAE.
Life-cycle with all spore-forms, so far as known.
Telial column conspicuous, becoming horny.
Uredinial peridium cellular. 12. CRONARTIUM.
Uredinial peridium paraphysate. 12*a*. CROSSOPSORA.
Telial column very short, becoming pulverulent at apex. 13. CEROTELIUM.
Life-cycle with only pycnia and telia.
Teliospores one-celled.
Telia in columns; peridium none or rudimentary.
Telial column long; teliospores somewhat fusiform. 14. CIONOTHRIX.
Telial column short.
Teliospores catenulate, globoid. 14*a*. ENDOPHYLLOIDES.
Teliospores in transverse layers. 15. ALVEOLARIA.
Telia not extruded.
Telia compact; peridia none. 16. BAEODROMUS.
Telia pulverulent; peridia evanescent. 17. ENDOPHYLLUM.
Teliospores two-celled; peridia persistent. 18. PUCCINIOSIRA.
Pycnia and other sori originating beneath the epidermis; telia erumpent, without peridia, teliospores one-celled, elongate, sessile and not agglutinate, the wall colorless; aecia when present with hyphal layer in place of a peridium; uredinia unknown. Subfamily CHRYSOCELISATAE. 19. CHRYSOCELIS.
Pycnia, aecia and uredinia unknown. Telia originating beneath the epidermis, erumpent, without peridia, teliospores one-celled, borne singly on pedicels, with colorless walls, pulverulent. Subfamily BOTRYORHIZATAE. 20. BOTRYORHIZA.

97. **UREDO.**

Exchange the generic name UREDO and its citation with the first name and citation in the synonymy. After the synonymy insert the following note:

It has been found during the interim since 1907, when the part of the North American Flora containing this genus was published, that it is very difficult and confusing to maintain the genus UREDO in its restricted sense, it having had and still has so large a use in its broad sense, and consequently the next oldest name, **MELAMPSORA,** is now substituted. This name accords with common usage.

Substitute the following key:

Host of telia and uredinia belonging to family Salicaceae.
Of the genus Populus.
Urediniospores smooth on the thickened sides.
Urediniospores ellipsoid, large, 26–35 μ long. 1. *M. Medusae.*
Urediniospores globoid, small, 18–24 μ long. 2. *M. Abietis-canadensis.*
Urediniospores without smooth spots.

Urediniospores rather large, 23–32 μ long.	3. *M. albertensis.*
Urediniospores very large, 32–48 μ long.	4. *M. occidentalis.*
Of the genus Salix.	
Urediniospores large, 17–24 μ long; wall thick.	5. *M. Bigelowii.*
Urediniospores small, 12–20 μ long.	
Urediniospore-wall thick, 2–3.5 μ.	6. *M. confluens.*
Urediniospore-wall medium-thick, 1.5–2 μ.	7. *M. Humboldtiana.*
Urediniospore-wall thin, 1–1.5 μ.	8. *M. arctica.*
Host of telia and uredinia belonging to family Linaceae.	9. *M. Lini.*
Host of telia and uredinia belonging to family Euphorbiaceae.	
Uredinia large, mostly 0.5–1 mm. long; paraphyses few.	10. *M. monticola.*
Uredinia small, mostly less than 0.5 mm. long; paraphyses numerous.	
Urediniospore-wall thick, 2–3 μ.	
Teliospore-wall not or only slightly thickened above.	11. *M. Euphorbiae.*
Teliospore-wall decidedly thickened above.	12. *M. Euphorbiae-Gerardianae.*
Urediniospore-wall thinner, 1.5–2 μ.	13. *M. Piscariae.*

98. **Uredo Medusae.**

Reduce this name to synonymy, and substitute for it the name now under synonymy.

Substitute, under Pinaceae, for the line giving host: *Larix laricina* (DuRoi) Koch (*L. americana* Michx.), Connecticut, Michigan, New York; Nova Scotia.

Change size of urediniospores to read " 16–23 by 26–35 μ."

Omit, under Salicaceae, *Populus angustifolia*, *P. grandidentata* and *P. trichocarpa*, with their localities, and also omit " Montana " under *P. balsamifera*, substituting for it " Connecticut, New Hampshire," and the same under *P. candicans*, substituting for it " Massachusetts, West Virginia," and also the same and " Ohio " under *P. tremuloides*, substituting for them " Arizona, Connecticut, Michigan, New York, Pennsylvania, Texas."

Add the telial host:

Populus Wislizeni (S. Wats.) Sarg., New Mexico.

Omit from the exsiccati: Kellerm. Ohio Fungi *144, 145;* change Griff. W. Am. Fungi " *369* " to read " *29,*" and add: Barth. Fungi Columb. *2843, 3640, 3821, 3822, 4641, 4737, 4940;* Barth. N. Am. Ured. *9, 316, 614, 912, 1011, 1121, 1122, 1212, 2021, 2121, 2212, 2331, 2414, 2415, 2624, 2726, 2727, 2728, 2918;* Brenckle, Fungi Dak. *79;* Thaxter, Rel. Farl. *230.*

99. **Uredo confluens.**

This species, and the two following, **Uredo alpina** and **Uredo Rostrupiana** (*M. arctica*), in order to conform to the order given in the new key, are renumbered and redescribed below. Insert, in their place:

2. **Melampsora Abietis-canadensis** (Farl.) C. A. Ludwig, Phytopathology **5**: 279. 1915.

Caeoma Abietis-canadensis Farl. Proc. Am. Acad. **20**: 323. 1885.
Peridermium fructigenum Arth. Bull. Torrey Club **37**: 578. 1910.
Caeoma Tsugae Spaulding, Science II. **33**: 194, hyponym. 1911.
Melampsora Populi-Tsugae J. J. Davis, Trans. Wis. Acad. **19**: 676. 1919.

O. Pycnia amphigenous and coniferous, scattered, punctiform, yellowish- or reddish-brown, noticeable, subcuticular, discoidal or conoidal, 50–125 μ broad by 32–40 μ high; ostiolar filaments none.

I. Aecia amphigenous, and on young stems and cones, thickly scattered, often crowded, oblong, 0.3–0.5 mm. broad by 0.7–1.5 mm. long, subepidermal, soon naked, dingy-white, somewhat pulverulent, ruptured epidermis noticeable; aeciospores broadly ellipsoid or obovate, rather small, 13–18 by 17–26 μ; wall colorless, 1–2 μ thick, finely and closely verrucose.

On Pinaceae:
Tsuga canadensis (L.) Carr. (*Abies canadensis* Michx.), Connecticut, Massachusetts, New York, Wisconsin; Nova Scotia, Quebec.

II. Uredinia amphigenous or only hypophyllous, scattered, roundish, small, 0.1–0.3 mm. across, early naked, pulverulent, orange-yellow fading to pale-yellow, ruptured

epidermis inconspicuous; paraphyses intermixed with the spores, capitate, smooth, 40–70 μ long, the heads 15–23 μ broad, the wall 3–5 μ thick, or twice as thick above, peripheral paraphyses thinner-walled and more clavate; urediniospores broadly ellipsoid or globoid, 13–18 by 18–24 μ, occasionally flattened laterally; wall colorless, uniformly 1.5–2 μ thick, or up to 5 μ on the flattened side, sparsely and evenly verrucose, or sometimes with a smooth spot on the flattened and thickened side.

III. Telia amphigenous, or only hypophyllous, scattered, sometimes confluent, irregularly roundish, small, 0.2–0.4 mm. across, somewhat elevated, reddish-brown, becoming darker, subepidermal; teliospores prismatic, 9–12 by 30–40 μ; wall smooth, cinnamon-brown, uniformly 1 μ thick, or slightly thickened above.

ON SALICACEAE:
Populus alba L. (*P. Bolleana* Mast.) (cult.), California, Oregon, Rhode Island, Washington; Ontario.
Populus candicans Ait., Connecticut, Massachusetts, Michigan.
Populus grandidentata Michx., Connecticut, Indiana, Michigan, New York, Ohio; Nova Scotia, Quebec.
Populus heterophylla L., Indiana.
Populus occidentalis (Rydb.) Britton (*P. Sargentii* Dode), Colorado, Iowa.
Populus tremuloides Michx., Connecticut, Indiana, Maine, New Hampshire, Ohio, Vermont; Ontario, Quebec.

TYPE LOCALITY: Chebacco Lake, Essex County, Massachusetts, on *Abies canadensis*.
DISTRIBUTION: Nova Scotia and Connecticut westward to Wisconsin and Iowa. The uredinial stage on *Populus alba*, placed here with considerable doubt, occurs in the northeastern and northwestern parts of the country; also in South America.
ILLUSTRATION: Bull. Penn. Agric. Exp. Sta. 160: *f. 7, 8*.
EXSICCATI: Barth. N. Am. Ured. *111, 2325, 2417, 2418, 2517;* Ellis & Ev. N. Am. Fungi *1882;* Kellerm. Ohio Fungi *144, 145;* Thaxter, Rel. Farl. *209*.

3. **Melampsora albertensis** Arth. Bull. Torrey Club **33**: 517. 1906.

Uredo albertensis Arth. N. Am. Flora **7**: 101. 1907.
Caeoma occidentale Arth. Bull. Torrey Club **34**: 591. 1907.
Caeoma Pseudotsugae-Douglasii Tubeuf, Nat. Zeits. Forst. Landw. **12**: 91. 1914.
Melampsora Pseudotsugae Tubeuf, Nat. Zeits. Forst. Landw. **12**: 91. 1914.

O. Pycnia amphigenous, scattered, minute, inconspicuous, subcuticular, honey-yellow, hemispheric, 65–100 μ broad by 23–32 μ high.

I. Aecia hypophyllous, sparsely arranged in two rows on yellow spots occupying part or all of a leaf, roundish to oblong, 0.3–0.4 mm. wide by 0.3–1 mm. or more long, soon naked, orange-yellow when fresh; aeciospores broadly ellipsoid, 20–24 by 27–32 μ; wall colorless, moderately thin, 1.5–2.5 μ, closely and finely verrucose.

ON PINACEAE:
Pseudotsuga mucronata (Raf.) Sudw. (*P. Douglasii* Carr., *P. taxifolia* Britton, *Abies Douglasii* Lindl.), Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming; British Columbia.

II. Uredinia hypophyllous, numerous, scattered, round, 0.2–0.4 mm. across, early naked, pulverulent, pale-yellow, ruptured epidermis evident; paraphyses intermixed with the spores, clavate, 9–15 by 67–90 μ, the wall colorless, 3–5 μ thick, the stipe solid; urediniospores broadly ellipsoid, 15–22 by 23–32 μ, usually flattened laterally and appearing oblong and narrower; wall colorless, 1.5–2 μ thick, much thickened on the flattened side, 2.5–3.5 μ, evenly and sparsely verrucose, with smooth spots.

III. Telia hypophyllous, or sometimes amphigenous, small, irregular, often confluent, usually crowded in more or less extensive, fused, cereous areas about the uredinia, subepidermal, waxy, orange-brown; teliospores prismatic, 10–13 by 29–39 μ; wall golden-brown, smooth, thin, about 1 μ, thicker above, 2–3 μ, with an evident apical pore.

ON SALICACEAE:
Populus acuminata Rydb., Colorado.
Populus angustifolia James, Colorado.
Populus balsamifera L., Colorado, Washington.
Populus mexicana Wesm., Lower California.
Populus occidentalis (Rydb.) Britton (*P. Sargentii* Dode), Colorado, Montana.
Populus tremuloides Michx. (*P. aurea* Tidestrom, *P. vancouveriana* Trel.), Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington, Wyoming; Alberta, British Columbia.

TYPE LOCALITY: Moraine Lake, Laggan, Alberta, on *Populus tremuloides*.

DISTRIBUTION: Colorado and Wyoming to Oregon and British Columbia, and in northern Lower California.

EXSICCATI: Barth. Fungi Columb. *2737, 2939, 3713, 4329, 4642, 5033;* Barth. N. Am. Ured. *511, 512, 610, 911, 1311, 1511, 1721;* Garrett, Fungi Utah. *205.*

4. **Melampsora occidentalis** H. S. Jackson, Phytopathology **7**: 354. 1917.

O and I. Pycnia and aecia unknown.

II. Uredinia chiefly hypophyllous, scattered, roundish, 0.5–1.5 mm. across, early naked, somewhat pulverulent, orange-yellow fading to pale-yellow, ruptured epidermis conspicuous; paraphyses numerous, intermixed with the spores, capitate or clavate, 42–77 μ long, the heads 16–24 μ broad, the wall colorless, 2.5–3 μ thick, sometimes twice as thick above; urediniospores ellipsoid, oblong or pyriform, 16–29 by 32–48 μ, slightly flattened laterally; wall colorless, 2–3 μ thick, or up to 7 μ on the flattened sides, moderately and prominently echinulate, without smooth spots.

III. Telia chiefly hypophyllous, scattered, or often crowded and confluent about the uredinia, irregularly round, small, 0.2–0.5 mm. across, slightly elevated, subepidermal, waxy, light cinnamon-brown becoming blackish-brown; teliospores prismatic, 10–20 by 40–64 μ; wall cinnamon-brown, smooth, 1–2 μ thick, darker and thicker above, 3–5 μ, the apical pore evident.

ON SALICACEAE:

Populus acuminata Rydb., Montana, Wyoming; British Columbia.
Populus angustifolia James, California, Montana, Washington, Wyoming.
Populus balsamifera L., Idaho, Montana, Washington, Wisconsin; British Columbia.
Populus candicans Michx., Montana.
Populus dilatata Ait. (*P. nigra italica* DuRoi, *P. pyramidalis* Salisb., *P. italica* Moench), California.
Populus hastata Dode, Montana.
Populus trichocarpa T. & G., California, Idaho, Montana, Oregon, Washington; British Columbia.

TYPE LOCALITY: Corvallis, Benton County, Oregon, on *Populus trichocarpa.*

DISTRIBUTION: Northern Wyoming westward to southern California and British Columbia, with one collection from central Wisconsin.

EXSICCATI: Barth. Fungi Columb. *3143, 3915, 4034, 4332, 4434, 4435, 4548;* Barth. N. Am. Ured. *806, 1315, 2920, 3021;* D. Griff. W. Am. Fungi *369.*

100. **Uredo Bigelowii.**

Reduce this name to synonymy, and substitute for it the name in the first line beneath.

Add, under Pinaceae, the hosts:

Larix decidua Mill. (*L. europaea* DC.), New York.
Larix laricina (DuRoi) Koch (*L. americana* Michx.), Maine, Michigan, New York, Vermont, Wisconsin.
Larix occidentalis Nutt., Oregon.

Substitute, under Salicaceae, the hosts:

Salix alaxensis (Anders.) Cov., Alaska.
Salix amygdaloides Anders., Colorado, Idaho, Indiana, Iowa, Kentucky, Kansas, Michigan, Montana, Nebraska, New Mexico, New York, Ohio, South Dakota, Washington, Wisconsin, Wyoming; Ontario.
Salix arbusculoides Fisch., Alaska.
Salix arctica Pallas, Alaska.
Salix Barclayi Anders., Alaska.
Salix Barrattiana Hook., Alberta.
Salix bella Piper, Montana, Washington.
Salix brachycarpa Nutt., Wyoming.
Salix caudata Nutt. (*S. lasiandra caudata* Sudw., *S. Bakeri* Seem., *S. lasiandra Fendleriana* Bebb, *S. Fendleriana* Auth. not Anders.), California, Idaho, Montana, Oregon, Utah, Washington, Wyoming.
Salix curtiflora Anders. (*S. pseudocordata* Anders.), Oregon.
Salix discolor Muhl. (*S. eriocephala* Michx., *S. prinoides* Pursh), Indiana, Maine, Michigan, Minnesota, New Hampshire, New York, Wisconsin.
Salix exigua Nutt. (*S. luteosericea* Rydb.), Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Washington, Wyoming.
Salix fluviatilis Nutt., Oregon.
Salix Geyeriana Anders., Colorado, Idaho, Nevada, Oregon.
Salix glaucops Anders., Colorado, Idaho; Alberta.
Salix irrorata Anders., Colorado, Idaho.
Salix laevigata Bebb, California.
Salix lasiandra Benth. (*S. Lyallii* Heller, *S. lasiandra Lyallii* Sarg.), California, Washington.

Salix Lemmoni Bebb, California.
Salix ovalifolia camdensis C. K. Schneid., Alaska.
Salix pentandra L., New York, Pennsylvania.
Salix Piperi Bebb, Oregon, Washington.
Salix pseudomyrsinites Anders., Colorado, Idaho, Montana, Oregon, Utah, Washington.
Salix pulchra Anders., Alaska.
Salix reticulata L., Alaska.
Salix Scouleriana Barratt (*S. flavescens* Nutt., *S. brachystachys* Benth.), California, Oregon, Utah, Washington, Wyoming.
Salix sitchensis Sanson, Alaska, Oregon; British Columbia.
Salix tenerrima Henderson (*S. exigua tenerrima* C. K. Schneid.), Idaho.
Salix vestita Pursh (*S. Fernaldii* Blankinship) Alberta.

Change, under exsiccati, Clements, Crypt. Form. Colo. "*148*" to "*603*," Griff. W. Am. Fungi "*341*" to "*45*," Sydow, Ured. "*1099*" to "*2343*."

Omit the exsiccati: Ellis, N. Am. Fungi *1484*, Ellis & Ev. Fungi Columb. *355*, *1937*, *2041*, Kellerm. Ohio Fungi *46*, *166*.

Add the exsiccati: Barth. Fungi Columb. *2533*, *2735*, *3141*, *3333*, *3528*, *3637*, *3715*, *3716*, *3914*, *4033*, *4236*, *4330*, *4432*, *4547*, *4639*, *4736*; Barth. N. Am. Ured. *8*, *214*, *315*, *410*, *611*, *613*, *718*, *1008*, *1118*, *1209*, *1210*, *1507*, *1508*, *1509*, *1510*, *1617*, *1722*, *1814*, *1916*, *2020*, *2120*, *2327*, *2518*, *2520*, *2521*, *2916*, *2917*; Brenckle, Fungi Dak. *176*; Garrett, Fungi Utah. *178*.

101. **Uredo albertensis.**

See 3. **Melampsora albertensis,** above.

101. Insert, before *Uredo Lini*, the 3 following species, in part given on pages 99 and 100 as nos. 2, 3, and 4:

6. **Melampsora confluens** (Pers.) H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 210. 1918.

Uredo confluens Pers. Obs. Myc. **1**: 98. 1796.
Caeoma Ribesii Link, in Willd. Sp. Pl. 6^2: 26. 1825.
Caeoma Ribis-alpini Wint. in Rab. Krypt. Fl. 1^1: 258. 1881.
Caeoma confluens Schroet. Krypt. Fl. Schles. 3^1: 376. 1887.
Melampsora Ribesii-purpureae Kleb. Jahrb. Wiss. Bot. **35**: 667. 1901.
Melampsora Ribesii-auritae Kleb. Jahrb. Wiss. Bot. **35**: 668. 1901.
Melampsora Ribesii-grandifoliae O. Schneider, Centr. Bakt. 15^2: 233. 1905.
Uredo Ribesii-purpureae Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.
Melampsora Ribesii-Salicum Bubák, Arch. Nat. Land. Böhmen 13^5: 200. 1908.

O. Pycnia chiefly epiphyllous, in small groups, crowded, punctiform, subepidermal, spheroidal becoming conoidal, 125–200 μ broad by 55–75 μ high.

I. Aecia hypophyllous, in small crowded groups on somewhat discolored spots, round, 0.3–0.8 mm. across, often confluent, soon naked, applanate, bright yellow fading to pale-yellow, ruptured epidermis noticeable; aeciospores globoid or broadly ellipsoid, 15–20 by 18–26 μ; wall colorless, moderately thick, 1.5–3 μ, finely and closely verrucose.

On Grossulariaceae:
Grossularia divaricata (Dougl.) Cov. & Britt. (*Ribes divaricatum* Dougl.), British Columbia.
Grossularia inermis (Rydb.) Cov. & Britt. (*Ribes inerme* Rydb., *R. saxosum* Hook., *R. vallicola* Greene), Utah.
Grossularia leptantha (A. Gray) Cov. & Britt. (*Ribes leptanthum* A. Gray), Utah.
Ribes aureum Pursh (*Chrysobotrya aurea* Rydb.), Utah.
Ribes lacustre (Pers.) Poir. (*Limnobotrya lacustris* Rydb.), Oregon, Washington; British Columbia.
Ribes nevadense Kellogg, California.
Ribes petiolare Dougl., Utah, Wyoming.
Ribes triste Pall., Yukon.

II. Uredinia chiefly hypophyllous, usually on noticeably yellow spots, scattered or in groups, round, small, 0.5–1 mm. across, soon naked, pulvinate, pale orange-yellow fading to yellowish-white, ruptured epidermis inconspicuous; paraphyses capitate or clavate, 40–70 μ long, the heads 16–25 μ broad; urediniospores globoid or broadly ovoid, small, 14–18 by 12–20 μ; wall colorless, thick, 2–3.5 μ, sparsely and evenly verrucose-echinulate, the pores indistinct.

III. Telia chiefly hypophyllous, scattered or in groups, often covering the entire surface, round, small, 0.3–0.5 mm. across, brownish, covered with the epidermis; teliospores irregularly prismatic, rounded at both ends, 7–11 by 20–35 μ; wall light-brown, smooth, thin, 1 μ or less, not thickened above.

ON SALICACEAE:
Salix argophylla Nutt., Idaho, Oregon.
Salix glauca L., Yukon.
Salix lasiolepis Benth. (*S. lasiolepis Bigelowii* Bebb, *S. Bigelowii* Torr.), Arizona, California, Oregon, Washington.
Salix lutea Nutt. (*S. lutea platyphylla* Ball), California, Idaho, Montana, Oregon, Utah, Wyoming.
Salix Mackenziana (Hook.) Barratt, Washington.
Salix monticola Bebb, Colorado.
Salix pennata Ball, Washington
Salix perrostrata Rydb., Arizona, Colorado, Idaho, Nebraska, New Mexico, Montana, Oregon, Wyoming; British Columbia.
Salix pseudomonticola Ball, Montana.
Salix Scouleriana Barratt (*S. flavescens* Nutt., *S. brachystachys* Benth.), Alaska, California, Colorado, Idaho, Oregon, Montana, New Mexico, Utah, Washington; British Columbia.
Salix sitchensis Sanson, Oregon, Washington.
Salix subcoerulea Piper (*S. pachnophora* Rydb.), Colorado, Idaho, Montana, New Mexico, Utah, Washington, Wyoming.
Salix tristis Ait., Minnesota.
Salix Watsoni (Bebb) Rydb. (*S. cordata Watsoni* Bebb), Colorado, New Mexico, Wyoming, Utah.

TYPE LOCALITY: Europe, on *Ribes alpinum*.
DISTRIBUTION: Wyoming to central California and northward in the mountains to central Yukon; also in Europe.
EXSICCATI: Barth. Fungi Columb. *2532, 2736, 3142, 3714, 3717, 3718, 4032, 4937;* Barth. N. Am. Ured. *314, 717, 1009, 1010, 1211, 1312, 1417, 1815, 2818, 2819;* Clements, Crypt. Form. Colo. *148;* Garrett, Fungi Utah. *71, 206;* D. Griff. W. Am. Fungi *341*.

7. **Melampsora Humboldtiana** Speg. An. Mus. Nac. Buenos Aires **23**: 28. 1912.

Melampsora americana Arth. Bull. Torrey Club **47**: 465. 1920.
Melampsora americana Jørstad, Rep. Sci. Res. Norw. Exped. Nov. Zemblya **18**: 11. 1923.

O. Pycnia hypophyllous, scattered among the aecia, broadly conic or hemispheric, yellowish or light-brown, rather inconspicuous, subcuticular but extending into and disintegrating the epidermal cells beneath, 80–150 μ broad by 50–95 μ high; ostiolar filaments none.

I. Aecia hypophyllous, scattered over part or all of the leaf on yellowish areas, oval or oblong, 0.3–0.8 mm. long, soon naked, pulverulent, at first orange, becoming pale-yellow, ruptured cuticle barely noticeable; aeciospores globoid or ellipsoid, 12–18 by 16–23 μ; wall colorless, 1.5–2.5 μ thick, closely and finely but noticeably verrucose.

ON PINACEAE:
Abies balsamea (L.) Mill., Michigan, Wisconsin, Vermont; Nova Scotia.
Abies concolor Lindl. & Gord., Colorado.
Abies grandis Lindl., Idaho, Oregon, Washington.
Abies lasiocarpa (Hook.) Nutt., Washington.

II. Uredinia hypophyllous, irregularly scattered, usually on yellow spots, round, either very small, 0.1–0.2 mm. across, and pale, or large, 0.2–0.5 mm. across, pulvinate, orange fading to pale-yellow, ruptured epidermis inconspicuous; paraphyses capitate or clavate-capitate, 20–30 μ broad in upper part, 30–60 μ long, in strongly capitate forms the wall 4–5 μ thick, obliterating the lumen of stalk, thicker at apex, 6–9 μ, in clavate forms the wall 1–2 μ thick, thicker above, 2–5 μ, colorless, smooth; urediniospores globoid or broadly ellipsoid, small, 13–16 by 15–20 μ; wall colorless, moderately thin, 1.5–2 μ, closely and finely verrucose.

III. Telia hypophyllous, scattered, irregularly roundish, 0.2–0.4 mm. across, reddish-brown, subepidermal, indehiscent; teliospores oblong or prismatic, rounded at both ends, 7–12 by 30–32 μ; wall light-brown, thin, 1 μ or less, slightly or not thickened above, smooth.

ON SALICACEAE:

Salix alba L. (*S. vitellina* L.), New York, Washington.
Salix argyrocarpa Nutt., New Hampshire.
Salix babylonica L., Missouri, West Virginia.
Salix balsamifera (Hook.) Barratt, Nova Scotia.
Salix Bebbiana Sarg. (*S. rostrata* Richards. not Thuill.), Maine, Michigan, Minnesota, Vermont, Wisconsin.
Salix Bonplandiana Kunth, Guatemala.
Salix candida Fluegge, Michigan.
Salix caprea L., West Virginia.
Salix commutata Bebb, British Columbia.
Salix cordata Muhl. (*S. cordata angustata* Anders.), Indiana, Kansas, Maine, Massachusetts, Montana, Nebraska, New York, Ohio, Vermont, West Virginia, Wisconsin; Manitoba.
Salix discolor Muhl. (*S. eriocephala* Michx., *S. prinoides* Pursh), New York; Nova Scotia, Quebec.
Salix fragilis L., Illinois.
Salix Gooddingii Ball (*S. vallicola* Britton), Arizona, California.
Salix Humboldtiana Willd., Sinaloa; Guatemala; Salvador.
Salix humilis Marsh., New York; Ontario, Quebec.
Salix interior Rowlee (*S. longifolia* Muhl. not Lam.), Indiana, Iowa, Kansas, Minnesota, Mississippi, Missouri, Montana, North Dakota, Ohio, Wisconsin.
Salix longipes Shuttlew. (*S. Wardi* Bebb), Florida, Oklahoma.
Salix lucida Muhl., Connecticut, Maine, Michigan, New York, Wisconsin; Ontario.
Salix Mackenziana (Hook.) Barratt, Idaho, Oregon; Alberta.
Salix melanopsis Nutt., Alberta.
Salix missouriensis Bebb, Missouri.
Salix monochroma Ball, Oregon.
Salix monticola Bebb, Colorado.
Salix Nelsonii Ball, Colorado.
Salix nigra Marsh., Alabama, Arkansas, Delaware, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia; Ontario.
Salix pedicellaris Pursh (*S. myrtilloides* Am. auth., not L.), Minnesota, Wisconsin.
Salix perrostrata Rydb., Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Washington.
Salix petiolaris J. E. Smith, Michigan, New York.
Salix purpurea L., New York, Pennsylvania.
Salix Scouleriana Barratt (*S. flavescens* Nutt.), Colorado, Idaho, Montana, Oregon, South Dakota, Washington; British Columbia.
Salix sericea Marsh., Connecticut, Indiana, New York, Virginia.
Salix taxifolia H.B.K., Guatemala.
Salix Wrightii Anders., Arizona, New Mexico.

TYPE LOCALITY: Montevideo, Uruguay, on *Salix Humboldtiana*.

DISTRIBUTION: Nova Scotia to British Columbia southward to West Virginia, New Mexico, and Central America; also in South America.

EXSICCATI: Barth. Fungi Columb. *2842, 2940, 3033, 3437, 3529, 3638, 3639, 3819, 4237, 4331, 4431, 4433, 4640, 5034;* Barth. N. Am. Ured. *110, 513, 612, 1119, 1313, 1314, 1416, 1506, 1618, 1915, 2119, 2210, 2211, 2326, 2328, 2329, 2330, 2519, 2522, 2622, 2815, 2816, 2817, 3019, 3213;* Brenckle, Fungi Dak. *37;* Ellis, N. Am. Fungi *280, 1484;* Ellis & Ev. Fungi Columb. *355, 1937, 2041;* Kellerm. Fungi Sel. Guat. *2;* Kellerm. Ohio Fungi *46, 166;* Rav. Fungi Car. **5**: *98;* Sydow, Ured. *1099, 2444*.

8. **Melampsora arctica** Rostr. Medd. Grønland **3**: 535. 1888.

Melampsora alpina Juel, Oefv. Sv. Vet.-Akad. Förh. **1894**: 417. 1894.
Uredo alpina Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.
Uredo Rostrupiana Arth. N. Am. Flora **7**: 100. 1907.

Description of pycnia, aecia, uredinia and telia, as well as the aecial hosts, same as given on page 99 under "*M. alpina*," with the addition of *Antiphylla oppositifolia* (L.) Fourr. (*Saxifraga oppositifolia* L.), Greenland. To the hosts on Salicaceae, given on the same page, add:

Salix anglorum Cham., Alberta.
Salix Chamissonis Anders., Alaska.
Salix glauca L., Greenland.
Salix glaucops Anders., Alberta.
Salix groenlandica (Anders.) Lundst., Greenland.
Salix herbacea L., New Hampshire; Greenland.
Salix ovalifolia Trautv., Alaska.
Salix petrophila Rydb. (*S. arctica petraea* Anders.), Alberta, British Columbia.
Salix sitchensis Bong., Alaska.
Salix stolonifera Cov., Alaska.

TYPE LOCALITY: Christianshaab, Greenland, on *Salix groenlandica*.
DISTRIBUTION: Summits of Mt. Washington, New Hampshire, Pike's Peak, Colorado, and other alpine regions northward into the boreal regions from Greenland to Alaska; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 314;* Sv. Bot. Tidskr. **4**: 200. *f. 3a, b.*

101. **Uredo Lini.**

Reduce this name to synonymy, and substitute:

9. **Melampsora Lini** (Schum.) Desmaz. Pl. Crypt. (Fasc. 41) *2049.* 1850.

Add the synonym: *Melampsora liniperda* Palm, Sv. Bot. Tidskr. **4**: (4). 1910.

Insert the following hosts:

Linum australe A. Heller, New Mexico.
Linum Berlandieri Hook. (*L. arkansanum* Osterh.), Wyoming.
Linum medium (Planch.) Britton, New York.
Linum micranthum A. Gray, California.
Linum rigidum puberulum Engelm., Wyoming.
Linum virginianum L., New York.

Insert: ILLUSTRATIONS: Jour. Bot. **28**: *pl. 298, f. 4;* Briosi & Cavara, Funghi Paras. *pl. 312;* Bull. Torrey Club **39**: *pl. 8, 9;* Grev. Scot. Crypt. Fl. *pl. 31;* Grove, Brit. Rust Fungi *f. 266;* McAlpine, Rusts Austr. *pl. 26, f. 236; pl. I, f. 36;* Mem. Accad. Verona III. **60**: *pl. 3, f. 21.*

Add the exsiccati: Barth. Fungi Columb. *3719, 3820, 4827, 4939;* Barth. N. Am. Ured. *411, 514, 1120, 1723, 2623, 3020, 3214;* Brenckle, Fungi Dak. *235, 235a, 441, 441a;* Clements, Crypt. Form. Col. *604;* Ellis & Ev. Fungi Columb. *1181,* not "*1118*" as given; Garrett, Fungi Utah. *78.*

102. Insert four additional species of *Melampsora:*

10. **Melampsora monticola** Mains, Phytopathology **7**: 103. 1917.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous and caulicolous, scattered or in circular groups, round or oblong, 0.2–2 mm. long, subepidermal, long covered by the epidermis, pulverulent, orange-yellow, ruptured epidermis conspicuous; paraphyses few, intermixed with the spores, capitate, 13–21 by 32–58 μ, the wall colorless, 1.5–3 μ thick, smooth, the stipe solid; urediniospores globoid, ellipsoid, or obovoid, 13–20 by 16–29 μ; wall colorless, 1.5–3 μ thick, finely and closely echinulate, the pores obscure.

III. Telia amphigenous and caulicolous, circinating about the uredinia, round or oblong, 0.1–1 mm. long, subepidermal, slightly elevated, blackish-brown; teliospores prismatic, 9–16 by 27–56 μ, rounded at both ends; wall light chestnut-brown below, darker towards the apex, 1–2 μ thick, thicker above, 2–4 μ.

ON EUPHORBIACEAE:
Tithymalus leptocerus (Engelm.) Arth. (*Euphorbia leptocera* Engelm.), Arizona, California, Oregon.
Tithymalus Palmeri (Engelm.) Abrams (*Euphorbia Palmeri* Engelm.), California.
Tithymalus robustus (Engelm.) Small (*Euphorbia robusta* Small), Colorado, Nebraska, South Dakota, Wyoming.
TYPE LOCALITY: Colorado Springs, Colorado, on *Euphorbia robusta.*
DISTRIBUTION: Wyoming and western Nebraska to central and southern California.
EXSICCATI: Barth. Fungi Columb. *4938;* Barth. N. Am. Ured. *1817, 1917, 1918, 2416, 2820, 2919.*

11. **Melampsora Euphorbiae** (Schubert) Cast. Obs. Myc. **2**: 18. 1843.

Uredo Euphorbiae-Helioscopiae Euphorbiae-exiguae Pers. Syn. Fung. 215. 1801.
Xyloma (Placuntium) Euphorbiae Schubert, in Ficinus, Fl. Dresd. ed. 2. **2**: 310. 1823.
Uromyces verrucipes Vuill. Bull. Soc. Bot. France **41**: 285. 1894.
Melampsora Euphorbiae-exiguae W. Müll. Centr. Bakt. II. Abt. **17**: 210. 1906; **19**: 449, 553. 1907.
Melampsora Euphorbiae-Pepli W. Müll. Centr. Bakt. II. Abt. **17**: 210. 1906; **19**: 450, 554. 1907.
Melampsora Euphorbiae-Cyparissiae W. Müll. Centr. Bakt. II. Abt. **19**: 453, 553. 1907.
Melampsora Cyparissiae W. Müll. Centr. Bakt. II. Abt. **19**: 561. 1907.

O. Pycnia flattened, hemispheric; ostiolar filaments none.

I. Aecia foliicolous and caulicolous, circular to oblong, 0.2–0.5 mm. long on the leaves,

1–4 mm. long on the stems, orange-yellow, without peridium or paraphyses; aeciospores globoid or ellipsoid, 19–24 by 21–28 μ; wall colorless, closely verrucose.

II. Uredinia amphigenous and caulicolous, scattered, circular or oval, 0.1–0.3 mm. long, early naked, pulverulent, pulvinate from the mass of paraphyses, golden-yellow fading to white, ruptured epidermis inconspicuous; paraphyses intermixed with the spores, numerous, capitate, 16–20 by 31–51 μ, the wall colorless, 3–4 μ thick, smooth; urediniospores globoid or ellipsoid, 13–19 by 17–23 μ; wall colorless, 2–3 μ thick, closely and finely echinulate, the pores obscure.

III. Telia amphigenous and occasionally caulicolous, scattered, circular or oval, small, 0.1–0.2 mm. long, covered with the epidermis, compact, pulvinate, dark chocolate-brown; teliospores prismatic, 7–13 by 32–45 μ; wall chestnut-brown above, lighter below, 1–1.5 μ thick, not thickened at the apex, smooth.

On Euphorbiaceae:
Tithymalus campester (Cham. & Schlecht.) Klotzsch & Gareke (*Euphorbia campestris* Cham. & Schlecht.), Mexico (state).
Tithymalus Cyparissias (L.) Hill (*Euphorbia Cyparissias* L.), Indiana, Maine, Massachusetts, Michigan, New Hampshire, Pennsylvania.
Type locality: Near Dresden, Germany, on *Euphorbia exigua*.
Distribution: Locally from Maine and Massachusetts to Michigan and Indiana, and in southern Mexico; also in Europe and Africa.
Illustrations: Cast. Cat. Pl. Marseille *pl. 5;* Beitr. Krypt. Schweiz 2^2: *f. 318;* Centr. Bakt. II. Abt. **19**: *f. 15–22, 30, 31.*
Exsiccati: Barth. N. Am. Ured. *1816;* Thaxter, Rel. Farl. *229a, b.*

12. **Melampsora Euphorbiae-Gerardianae** W. Müll. Centr. Bakt. II. Abt. **17**: 210. 1906; **19**: 452, 548. 1907.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous and caulicolous, scattered, circular, 0.2–0.5 mm. in diameter, subepidermal, soon naked, pulverulent, pulvinate due to the crowded paraphyses, pale-yellow, ruptured epidermis inconspicuous; paraphyses numerous, intermixed with the spores, capitate, 16–19 by 51–58 μ, the wall colorless, 2–3 μ thick; urediniospores globoid or ellipsoid, 13–16 by 16–20 μ; wall colorless, 2–3 μ thick, finely and closely echinulate, the pores obscure.

III. Telia caulicolous, probably also amphigenous, circinating about the uredinia, oblong, 0.2–1 mm. long, subepidermal, slightly elevated, blackish-brown; teliospores prismatic, 9–15 by 31–60 μ, rounded at both ends; wall light chestnut-brown, darker toward the apex, 1.5 μ thick, 3–6 μ above.

On Euphorbiaceae:
Tithymalus commutatus (Engelm.) Klotzsch & Garcke (*Euphorbia commutata* Engelm.), Indiana.
Type locality: [Switzerland], on *Euphorbia Gerardiana*.
Distribution: Indiana; also in Europe and western Asia.
Illustration: Centr. Bakt. II. Abt. **19**: 547–550. *f. 4–9.*

13. **Melampsora Piscariae** H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 212. 1918.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, rounded, 0.3–0.5 mm. across, early naked, somewhat pulverulent, orange-yellow fading to whitish, ruptured epidermis conspicuous; paraphyses numerous, intermixed with the spores, capitate, smooth or with an occasional conically echinulate marking, 32–64 μ long, the heads 12–18 μ broad, the wall uniformly 2.5–4 μ thick; urediniospores globoid or ellipsoid, 14–16 by 16–19 μ; wall colorless, 1.5–2 μ thick, finely and closely verrucose-echinulate.

III. Telia unknown.

On Euphorbiaceae:
Piscaria setigera (Hook.) Piper (*Eremocarpus setigerus* Benth.), Oregon.
Type locality: Corvallis, Oregon, on *Piscaria setigera*.
Distribution: Known only from the type locality.

102. Insert:

1a. APLOPSORA Mains, Am. Jour. Bot. **8**: 442. 1921.

Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal.

Uredinia erumpent, pulverulent, with peripheral paraphyses. Urediniospores borne singly on pedicels, globoid or obovoid; wall somewhat colored, echinulate, the pores obscure.

Telia tardily naked, small, in a single layer of closely appressed spores. Teliospores one-celled, cylindric; wall colorless, smooth.

Type species, *Uredo Nyssae* Ellis & Tracy (on "*Nyssa capitata*," error for *N. aquatica*).

1. **Aplopsora Nyssae** (Ellis & Tracy) Mains, Am. Jour. Bot. **8**: 442. 1921.

Uredo Nyssae Ellis & Tracy, Jour. Myc. **6**: 77. 1890.

II. Uredinia hypophyllous, scattered, round, minute, 0.1–0.3 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; paraphyses peripheral, united below into a short inconspicuous pseudoperidium, clavate, incurved, 16–26 μ long, the wall 1 μ thick, on convex side above up to 3 or 4 μ, brownish-yellow; urediniospores obovoid or oblong, 13–17 by 16–26 μ; wall yellow or pale cinnamon-brown, 1 μ, rather closely and finely echinulate, the pores obscure.

III. Telia hypophyllous, gregarious in small groups, round, small, 0.2–0.5 mm. in diameter, at first covered by the epidermis, soon becoming naked, very pale translucent yellow, becoming cinereous by germination; teliospores cylindric, 7–15 by 29–40 μ, rounded above and below; wall colorless, very thin, 0.5 μ or less, uniform in thickness, smooth.

ON NYSSACEAE:
Nyssa aquatica L., Kentucky, Mississippi.
TYPE LOCALITY: Jackson, Mississippi, on "*Nyssa capitata*," error for *N. aquatica*.
DISTRIBUTION: Swamps from western Kentucky southward through Mississippi to the Gulf of Mexico.
ILLUSTRATION: Am. Jour. Bot. **8**: 243. *f. 1, 2;* 244. *f. 3.*

102. Insert:

1b. NECIUM.

Formerly no. **9**, on page 114; corrections and additions given below at page 682.

102. **PHYSOPELLA.**

Replace **Physopella** (and the next genus, **Bubakia,** page 104) by:

2. **PHAKOPSORA** Dietel, Ber. Deuts. Bot. Ges. **13**: 334. 1895.

Physopella Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.
Bubakia Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.
Uromycodes Clements, Gen. Fungi 98. 1909.

Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal.

Uredinia erumpent, definite, roundish, pulverulent. Paraphyses when present peripheral, either free and incurved or imbricated by the union of their bases and the free part extending into the sorus, thus forming a pseudoperidium, or in part or entirely replaced by a membranous peridium. Urediniospores borne singly on pedicels, obovate-globoid or ellipsoid; wall pale-yellow, echinulate or rarely verrucose, the pores obscure.

Telia indehiscent, forming lenticular masses two or more cells thick at center. Teliospores 1-celled, more or less catenulate, prismatic or oblong; wall somewhat colored, smooth.

Type species, *Melampsora punctiformis* Barcl. & Dietel (on *Galium Aparine*).

Paraphyses free, incurved.	1. *P. Vitis.*
Paraphyses imbricated, forming a pseudoperidium.	
Urediniospores echinulate.	
Urediniospores small, 19–23 μ long.	2. *P. Meibomiae.*
Urediniospores larger, 24–29 μ long.	3. *P. Vignae.*
Urediniospores verrucose.	4. *P. Aeschynomenis.*
Paraphyses converted into a membranous peridium.	5. *P. fenestrata.*
Paraphyses wanting.	
Urediniospores with uniformly thin walls.	6. *P. Crotonis.*
Urediniospores with walls thicker above.	7. *P. mexicana.*

1. **Phakopsora Vitis** (Thüm.) Sydow, Hedwigia **38**: 141. 1899.

Uredo Vitis Thüm. Pilze Weinst. 182. 1878.
Uredo Vialae Lagerh. Compt. Rend. Acad. Sci. Paris **110**: 729. 1890.
Physopella Vitis Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.

Add the hosts:

Muscadinia Munsoniana (Simpson) Small (*Vitis Munsoniana* Simpson), Florida.
Vitis tiliaefolia Humb. & Bonpl. (*V. caribaea* DC.), Florida; Guatemala.

103. **Physopella ficina.**

This species and the two following on the same page are transferred to the genus **Cerotelium** on page 696.

103. Insert:

2. **Phakopsora Meibomiae** Arth. Bull. Torrey Club **44**: 509. 1917.

Physopella Meibomiae Arth. Mycologia **9**: 59. 1917.

II. Uredinia hypophyllous, scattered or somewhat grouped on discolored areas, small, about 0.1 mm. across, at first punctiform, pale, opening by a pore about which the spores accumulate; paraphyses imbricated to form a pseudoperidium, small, incurved, clavate, 7–10 by 26–64 μ, the wall colorless, thin, slightly thicker above; urediniospores globoid or broadly obovoid, 13–19 by 19–23 μ; wall colorless, thin, 1–1.5 μ, very closely and finely echinulate, the pores obscure.

III. Telia hypophyllous, associated with the uredinia, inconspicuous, giving no surface indication, lenticular, small, about 0.1 mm. across and one half as high; teliospores imperfectly catenulate in chains of 2 or 3, closely compacted, the outer spores larger, irregularly oblong, 9–12 by 13–19 μ, the wall thin, 1 μ or less, somewhat thicker above, 2–2.5 μ, pale cinnamon-brown, dark cinnamon-brown above, the inner spores globoid or ellipsoid, paler, the wall not thickened above, smooth.

ON FABACEAE:
Meibomia supina (Sw.) Britton (*Desmodium supinum* DC.), Porto Rico.
Meibomia tortuosa (Sw.) Kuntze (*Desmodium tortuosum* DC.), Santo Domingo.
TYPE LOCALITY: Añasco, Porto Rico, on *Meibomia supina.*
DISTRIBUTION: West Indies; also in northern South America.

3. **Phakopsora Vignae** (Bres.) Arth. Bull. Torrey Club **44**: 509. 1917.

Uredo Vignae Bres. Rev. Myc. **13**: 66. 1891.
Uredo Sojae P. Henn. Hedwigia Beibl. **42**: 108. 1903. Not *Uromyces Sojae* Sydow, 1906.
Uredo concors Arth. Mycologia **7**: 330. 1915.
Physopella concors Arth. Mycologia **9**: 60. 1917.

II. Uredinia hypophyllous, in small groups on discolored often reddish spots, mammillose, small, 0.1–0.3 mm. across, finally opening by a central pore; paraphyses imbricated to form a pseudoperidium, colorless or golden-brown, the free ends clavate, the wall moderately thick; urediniospores broadly ellipsoid or somewhat obovoid, 15–21 by 19–28 μ; wall nearly or quite colorless, thin, 1.5 μ, closely and finely echinulate, the pores obscure.

III. Telia unknown.

ON FABACEAE:
Dolichos Lablab L. (*Lablab vulgaris* Savi), Porto Rico.
Eriosema crinitum (H.B.K.) DC., Cuba.
Phaseolus lunatus L., Porto Rico.
Teramnus uncinatus (L.) Sw., Porto Rico.
Vigna lutea A. Gray, St. Thomas.
TYPE LOCALITY: St. Thomas, West Indies, on *Vigna lutea.*
DISTRIBUTION: West Indies; also in Japan, Java, and the Philippine Islands.

104. **Physopella Aeschynomenis.**

Reduce this name to synonymy, and substitute:

4. **Phakopsora** (?) **Aeschynomenis** Arth. Bull. Torrey Club **44**: 509. 1917.

Add to the locality for the host: Cuba; Porto Rico.

Change the distribution to read: Southern Mexico and the West Indies; also in northern South America.

104. Insert:

5. **Phakopsora fenestrala** Arth. Bull. Torrey Club **44**: 508. 1917.

Uredo fenestrala Arth. Mycologia **7**: 332. 1915.
Schroeteriaster fenestrala Arth. Mycologia **8**: 24. 1916.

II. Uredinia hypophyllous, irregularly scattered, or occasionally in small groups pustular, 0.1–0.3 mm. across, opening by a central pore becoming enlarged and irregular peridium membranous, delicate, the cells elongated at the sides, nearly isodiametric above, 10–13 μ across, the walls evenly thin, with the ostiolar cells unmodified; uredinio spores obovoid or ellipsoid, inclined toward pyriform, 16–22 by 25–36 μ; wall pale cinnamon-brown, slightly paler below, evenly thin, 1–1.5 μ, moderately echinulate, the pores indistinct, apparently 2 or 3 and somewhat superequatorial.

III. Telia hypophyllous. scattered, or somewhat grouped on indefinite yellowish spots punctiform, slightly elevated, dark-brown, 0.1–0.3 mm. across, lenticular; teliospores imperfectly catenulate in chains of 2–4, closely compacted, oblong, 10–16 by 23–27 μ wall light cinnamon-brown, thin, 1–1.5 μ, outer wall of terminal spore thicker, 3–5 μ smooth.

ON EUPHORBIACEAE:
Phyllanthus distichus (L.) Müll.-Arg., Porto Rico.
Phyllanthus grandifolius L. (*Asterandra grandifolia* Britton), Porto Rico; Santo Domingo.
Phyllanthus Niruri L., Porto Rico.
TYPE LOCALITY: Bayamon, Porto Rico, on *Phyllanthus grandifolius*.
DISTRIBUTION: West Indies.

104. **Bubakia Crotonis.**

Reduce this name to synonymy, and substitute:

6. **Phakopsora Crotonis** (Burr.) Arth. Bull. Torrey Club **44**: 508. 1917.

Add the synonyms: *Uredo Wrightii* Berk. & Curt. Grevillea **20**: 110, hyponym 1892. *Uredo crotonicola* P. Henn. Hedwigia **35**: 251. 1896. *Schroeteriaster Crotonis* Dietel; Sydow, Monog. Ured. **3**: 401. 1914.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 15, f. 147.*

Add the exsiccati: Barth. Fungi Columb. *2802, 4208, 4209, 4608;* Barth. N. Am Ured. *905, 1104, 1304, 2004, 2106, 2301, 2501, 2502, 2609, 2610, 2704, 2705, 2706, 2801 2802, 3207.*

104. **Bubakia mexicana.**

Reduce this name to synonymy, and substitute:

7. **Phakopsora mexicana** Arth. Bull. Torrey Club **44**: 508. 1917.

Add the synonyms: *Melampsora mexicana* Sacc. & Trott. in Sacc. Syll. Fung. **21** 601. 1912. *Schroeteriaster mexicanus* Sydow, Monog. Ured. **3**: 402. 1914.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 15, f. 149.*

105. Insert:

3. **OLIVEA** Arth. Mycologia **9**: 60. 1917.

Cycle of development includes pycnia, aecia, uredinia, and telia. Aecia subepidermal other sori subcuticular.

Pycnia mammiliform, without ostiolar filaments.

Aecia deep-seated, protected by the host-tissues. Peridium apparently wanting. Aeciospores catenulate with noticeable intercalary cells, obovate, strongly echinulate-verrucose with rod-like warts; wall colored, in appearance simulating urediniospores.

Uredinia from a minute hymenium, expanding into a globose mass with strongly incurved paraphyses, having their bases united. Urediniospores borne singly on pedicels, obovate, stellately angular; wall colored, echinulate, the pores approximately equatorial, at the angles.

Telia from an inconspicuous hymenium, or replacing the uredinia in the basket of paraphyses. Teliospores free, 1-celled, sessile, cylindraceous; wall colorless, thin, smooth.

Type species, *Uredo capituliformis* P. Henn. (on *Alchornea* sp.).

Urediniospores obovate, strongly stellate, the pores obscure. 1. *O. capituliformis.*
Urediniospores globoid-obovate, somewhat stellate, the pores 4, equatorial. 2. *O. Petitiae.*

1. **Olivea capituliformis** (P. Henn.) Arth. Mycologia **9**: 61. 1917.

Uredo capituliformis P. Henn. Hedwigia **34**: 97. 1895.
Ravenelia capituliformis P. Henn. Hedwigia **43**: 160. 1904.

O. Pycnia epiphyllous, in small groups, mammiliform, honey-yellow, becoming sunken by depressing or absorbing the epidermal cells beneath, 80–165 μ across by 50–95 μ high; ostiolar filaments wanting; pycniospores oblong, 3–4 by 4–7 μ.

I. Aecia amphigenous, more abundant above, gregarious on slightly discolored spots 2–5 mm. across, pustular, brown, deep-seated among the palisade-cells of the host, ostiolate; peridium none, but with hyphal layer 25–35 μ thick; aeciospores obovate, stellately protuberant with one apical and four lateral swellings, 20–24 by 27–35 μ; wall cinnamon-brown, 1–2 μ thick, closely and strongly echinulate-verrucose with colorless rod-like warts 2–3 μ long.

II. Uredinia chiefly hypophyllous, often opposite the aecia, gregarious, forming globose, chestnut-brown balls 0.1–0.3 mm. in diameter, seated lightly on the leaf-surface; paraphyses cylindric, 9–11 by 75–100 μ, incurved, strong, united at the bases, forming a globose basket, the wall dark chestnut-brown, thick, nearly or quite closing the lumen; urediniospores simulating the aeciospores, obovate, stellately protuberant with one apical and four lateral swellings, 23–29 by 28–33 μ; wall cinnamon-brown, 1–1.5 μ thick, closely and finely echinulate, the pores obscure.

III. Telia hypophyllous, or replacing the uredinia in the same sorus; teliospores cylindric or cylindric-clavate, 12–16 by 45–60 μ, rounded above; wall colorless, uniformly thin, 1 μ or less, smooth.

ON EUPHORBIACEAE:
Alchornea latifolia Sw., Porto Rico; Tortola.
TYPE LOCALITY: Goyaz, Serra dos Pyreneos, Brazil, on *Alchornea* sp.
DISTRIBUTION: West Indies; also in South America.

2. **Olivea Petitiae** Arth. Mycologia **9**: 62. 1917.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, somewhat grouped on indefinite, brownish spots, or scattered, forming globose, chestnut-brown balls 0.1–0.3 mm. in diameter, seemingly superficial; paraphyses cylindric, 8–10 by 90–175 μ, incurved, joined by their bases, forming a globose basket holding the spores, the wall dark cinnamon-brown, thick, nearly or quite closing the lumen; urediniospores globoid-obovate, somewhat stellately angular, 24–32 by 29–32 μ; wall cinnamon-brown, about 1.5 μ thick, moderately echinulate, the pores approximately equatorial, usually 4, one at each projecting angle.

III. Telia replacing the uredinia in the same sorus; teliospores clavate or fusiform-clavate, 13–19 by 45–58 μ, rounded or narrowed above; wall colorless, uniformly thin, 1 μ or less, smooth.

ON VERBENACEAE:
Petitia domingensis Jacq., Porto Rico.
TYPE LOCALITY: Maricao, mountains along the Rio Grande river, Porto Rico, on *Petitia domingensis*.
DISTRIBUTION: Known only from the type locality.

105. In the key.

Replace lines 5 and 6 by:

Urediniospores broadly obovate.	
Urediniospores medium-sized, 15–24 μ long.	3. *P. Agrimoniae.*
Urediniospores smaller, 14–20 μ long.	3a. *P. Potentillae.*
Urediniospores narrowly obovate.	
Peridium hemispheric.	4. *P. arcticum.*
Peridium conic.	4a. *P. americanum.*

Change *minimum* to *Myrtilli.*

In the last line, change " 9 " to read 8.

Add the line:

Host belonging to family Rubiaceae.	9. *P. Galii.*

106. **Pucciniastrum Hydrangeae.**

Add the synonym: *Peridermium Hydrangeae* J. F. Adams, Mycologia **12**: 34. 1920.

Replace the line below the synonymy by:

O. Pycnia chiefly hypophyllous, inconspicuous, flattened-hemispheric, 75–140 μ across, 20–32 μ high.

I. Aecia hypophyllous, in two rows, cylindric, 160–220 μ in diameter, 1–1.5 mm. high; peridium colorless, fragile, the margin erose; peridial cells in face view angularly oblong, in side view linear-oblong, 15–20 by 38–48 μ, slightly overlapping, the outer wall very thin, smooth or finely verrucose, the inner wall thicker, about 2 μ, evenly and prominently verrucose; aeciospores broadly ellipsoid or ovoid, 14–20 by 19–26 μ; wall colorless, finely verrucose, except an elongate smooth spot on one side, thin, about 1 μ on smooth side, slightly thicker on opposite side.

ON PINACEAE:
Tsuga canadensis (L.) Carr., Indiana, Pennsylvania.

Insert: ILLUSTRATION: Bull. Penn. Exp. Sta. 160: *f. 9c.*

Add the exsiccati: Barth. Fungi Columb. *2868;* Barth. N. Am. Ured. *76, 2378, 2875.*

106. **Pucciniastrum Agrimoniae.**

Insert the synonyms: *Uredo Agrimoniae* Schröt. Krypt.-fl. Schles. **3**[1]: 374. 1887. *Pucciniastrum Agrimoniae-Eupatoriae* Lagerh. Tromsö Mus. Aarsh. **17**: 92. 1895. *Pucciniastrum ochraceum* Lind, Dan. Fungi Rostr. 293. 1913.

Add the host: *Agrimonia rostellata* Wallr., Indiana.

Add the illustrations: Bon. Coniom. *pl. 1, f. 15;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 31, f. c; pl. 32, f. 4;* Grove, Brit. Rust Fungi *f. 272.*

Add the exsiccati: Barth. Fungi Columb. *2867, 4169;* Barth. N. Am. Ured. *75, 176, 281, 1277, 1580, 2083, 2278, 2279, 2377, 2477, 2686, 2874, 3177, 3278;* Brenckle, Fungi Dak. *85.*

106. Insert:

3a. **Pucciniastrum Potentillae** Kom. in Jacz.-Kom.-Tranz. Fungi Rossiae *327.* 1900.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, round, small, 0.1–0.2 mm. in diameter, dehiscent by a central pore; peridium delicate, hemispheric; peridial cells small, 9–16 μ long, thin, 2 μ, smooth, the ostiolar cells larger, 20–25 μ high, thick-walled, 3–4 μ, slightly echinulate or smooth; urediniospores broadly obovate or globoid, 12–15 by 14–19 μ; wall colorless, finely echinulate, thin, 1.5 μ.

III. Telia hypophyllous, minute, subepidermal, reddish-brown; teliospores intercellular, globoid, 14–22 by 16–26 μ, cinnamon-brown.

ON ROSACEAE:
Sibbaldiopsis tridentata (Soland.) Rydb. (*Potentilla tridentata* Soland.), Maine, Minnesota, New Hampshire, New York, Wisconsin; New Brunswick, Ontario.
TYPE LOCALITY: Manchuria, on *Potentilla fragarioides*.
DISTRIBUTION: Southern Maine to western end of Lake Superior; also in eastern Asia.
EXSICCATI: Barth. Fungi Columb. *2367;* Thaxter, Rel. Farl. *279*.

107. **Pucciniastrum arcticum.**

Add the hosts:

Rubus acaulis Michx., Alaska.
Rubus Chamaemorus L., Alaska.
Rubus pubescens Raf. (*R. triflorus* Richards.), Connecticut, Minnesota, New Hampshire, Wisconsin; Manitoba, New Brunswick.

Emend the distribution by inserting after Alaska, "to New Brunswick and northwestern Connecticut."

107. Insert:

4a. **Pucciniastrum americanum** (Farl.) Arth. Bull. Torrey Club **47**: 468. 1920.

Pucciniastrum arcticum americanum Farl. Rhodora **10**: 16. 1908.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, thickly scattered over large areas, small, dehiscent by apical pore, pulverulent; peridium colorless, conic, extending above the epidermis; peridial cells angularly ellipsoid, smooth, the ostiolar cells 5 or 6, globoid or oval, large, 18–26 μ in diameter, sparsely and prominently aculeate, free, somewhat contracted below into a smooth neck; urediniospores obovate or oblong-ellipsoid, 10–18 by 15–26 μ; wall colorless, thin, 1–1.5 μ, echinulate with low points.

III. Telia hypophyllous, small; teliospores ellipsoid, 24–28 μ in diameter; wall brownish, smooth.

ON ROSACEAE:
Rubus melanolasius Focke (*R. idaeus melanolasius* Focke), Idaho, Montana; British Columbia.
Rubus neglectus Peck (*R. occidentalis* × *strigosus* Rydb.), Massachusetts.
Rubus strigosus Michx. (*R. idaeus aculeatissimus* Rob. & Fernald), Connecticut, Iowa, Maine, Massachusetts, New Hampshire, New Jersey, New York, North Dakota, Ohio, West Virginia, Wisconsin; Nova Scotia, Ontario, Quebec.
TYPE LOCALITY: "Near Cambridge" [Bussey, October, 1875], Massachusetts, on "*Rubus occidentalis*," later determined as *R. neglectus*.
DISTRIBUTION: British Columbia to Nova Scotia, and southward in the Alleghany mountains to West Virginia.
ILLUSTRATIONS: Hedwigia **44**: 331. *f. 1, 2;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 32, f. 3.*
EXSICCATI: Barth. Fungi Columb. *4067, 4577;* Barth. N. Am. Ured. *377, 482, 876, 1086, 1480, 1881, 2280;* Brenckle, Fungi Dak. *293;* Ellis, N. Am. Fungi *282;* Ellis & Ev. Fungi Columb. *1190;* Seym. & Earle, Econ. Fungi *32*.

107. **Pucciniastrum pustulatum.**

Omit the third and fourth synonyms, *Uredo Epilobii* DC., and *Caeoma Epilobii* Link, and add: *Pucciniastrum Chamaenerii* Rostr. Plantep. Haandb. 304. 1902.

Omit the line under Pinaceae, and substitute the following:

Abies amabilis (Loud.) Forbes, Washington; British Columbia.
Abies arizonica Merriam, Colorado.
Abies balsamea (L.) Mill., Michigan, New York, Wisconsin; Nova Scotia.
Abies concolor Lindl. & Gord., Colorado.
Abies grandis Lindl., Idaho, Montana, Washington.
Abies lasiocarpa (Hook.) Nutt., Alaska, Colorado, Idaho, Montana, Oregon, Washington; British Columbia.
Abies nobilis Lindl., Oregon.

Add the hosts, under Onagraçeae:

Chamaenerion exaltatum Rydb., Alaska.
Clarkia elegans Dougl. (*Phaeostoma elegans* A. Nelson), Alaska.
Epilobium brevistylum Barbey, Oregon.
Epilobium californicum Haussk., California.
Epilobium franciscanum Barbey, California.
Epilobium glandulosum Lehm., Alaska.
Epilobium novomexicanum Haussk., New Mexico.
Epilobium palustre L., Alaska.
Epilobium platyphyllum Rydb., Montana.
Godetia grandiflora Lindl., Alaska.

Add the illustrations: Rostrup, Plantep. Haandb. *f. 120;* E. & P. Nat. Pfl. 1^{1**}: *f. 29*^{D}; Bot. Gaz. **77**: *pl. 4, f. 31, 32; pl. 5, f. 40, 41.*

Add the exsiccati: Barth. Fungi Columb. *2575, 2782, 3180, 3773, 4334, 4335, 4470, 4471;* Barth. N. Am. Ured. *77, 877, 978, 979, 1087, 1279, 1379, 1482, 1680, 2084, 2575, 2576, 2876, 2977;* Brenckle, Fungi Dak. *371, 420;* Garrett, Fungi Utah. *95, 111;* Sydow, Ured. *2134.*

108. **Pucciniastrum Pyrolae.**

Omit the hosts *Chimaphila umbellata* and *Pyrola rotundifolia*, and insert in due sequence:

Chimaphila corymbosa Pursh, Wisconsin.
Chimaphila occidentalis Rydb., Oregon.
Erxlebenia minor (L.) Rydb. (*Pyrola minor* L.), Colorado, Idaho, Montana; Alberta.
Moneses uniflora (L.) A. Gray, Alberta.
Pyrola asarifolia Michx. (*P. rotundifolia asarifolia* Hook.), Alaska, Colorado.

Add: ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^{2}: *f. 337;* Grove, Brit. Rust Fungi *f. 275.*

108. **Pucciniastrum sparsum.**

Add the synonym: *Thekopsora sparsa* Magn. in Dalla Torre & Sarnth. Fl. Tirol **3**: 118. 1905.

Replace the line below the synonymy by:

O. Pycnia amphigenous, somewhat conoidal or applanate, inconspicuous, small, 70–100 μ in diameter, about 35 μ high.

I. Aecia from a limited mycelium, hypophyllous, on slightly discolored spots, cylindric, apically dehiscent in somewhat lid-like manner; peridial cells in face view polygonal, in side view rhomboidal, slightly overlapping, the outer wall very thin, smooth, the inner wall about 5 μ thick, finely verrucose; aeciospores globoid or broadly ellipsoid, 18–25 by 21–32 μ; wall colorless, thin, about 1 μ, finely verrucose except a small smooth spot on one side.

ON PINACEAE:
Picea excelsa (Lam.) Link (*P. Abies* Karst., *P. vulgaris* Link, *Pinus Abies* L.), Europe; not yet found in America.

Under hosts on Ericaceae, substitute " Oregon " for " California " after *Arctostaphylos Manzanita*, and add the host: *Arctostaphylos Hookeri* G. Don, California.

Add the illustration: Mitt. Nat. Ges. Bern **1916**: 132. *f. 1.*

Add the exsiccati: Barth. Fungi Columb. *3181;* Barth. N. Am. Ured. *779, 3279.*

109. **Pucciniastrum minimum** and **P. Myrtilli.**

Unite under " 8. **Pucciniastrum Myrtilli,**" all that is given for both.

Add the synonyms: *Peridermium Peckii* Thüm. Mitt. Forstl. Vers. Oest. **2**: 320. 1881. *Uredo Andromedae* Cooke; De-Toni, in Sacc. Syll. Fung. **7**: 853. 1888. *Pucciniastrum Vacciniorum* Dietel, in E. & P. Nat. Pfl. 1^{1**}: 47. 1897. *Aecidium Peckii* Dietel, in E. & P. Nat. Pfl. 1^{1**}: 78. 1897.

Instead of the lines " O and I. Pycnia and aecia unknown," insert:

O. Pycnia hypophyllous, numerous, scattered, inconspicuous, extending considerably into the walls of the epidermal cells, low and applanate, small, 65–125 μ broad, 20–26 μ high.

I. Aecia hypophyllous, from a limited mycelium, in two rows on yellow spots occupying part or usually all the leaf, cylindric, small, 0.2–0.3 mm. in diameter, 0.5–1 mm. high; peridial cells delicate, readily falling apart, slightly overlapping, the outer wall very thin, smooth, the inner wall 4–5 μ thick, moderately verrucose; aeciospores globoid or broadly ellipsoid, 15–21 by 18–27 μ; wall colorless, thin, 1–1.5 μ, finely and evenly verrucose.

ON PINACEAE:
Tsuga canadensis (L.) Carr. (*Abies canadensis* Michx.), Connecticut, Massachusetts, Michigan, New Hampshire, New York, Virginia, West Virginia, Wisconsin; Nova Scotia.

Add the hosts, under Ericaceae:

Neopieris mariana (L.) Britton (*Andromeda mariana* L., *Pieris mariana* Benth. & Hook.), Delaware.
Neopieris nitida (Bartr.) Britton (*Andromeda nitida* Bartr., *Pieris nitida* Benth. & Hook.), Georgia.
Xolisma ligustrina (L.) Britton (*Andromeda ligustrina* Muhl.), Alabama, Arkansas, Delaware.

Add the hosts, under Vacciniaceae:

Oxycoccus macrocarpus (Ait.) Pursh (*Vaccinium macrocarpon* Ait.), Oregon (cult.).
Vaccinium alaskense Howell, Alaska.
Vaccinium angustifolium Ait. (*V. pennsylvanicum* Lam.), Connecticut, New Hampshire; Nova Scotia.
Vaccinium erythrococcum Rydb. (*V. Myrtillus microphyllum* Hook.), Alberta.
Vaccinium macrophyllum (Hook.) Piper, Idaho, Oregon.
Vaccinium ovalifolium Smith, Alaska, Oregon, Washington.
Vaccinium parvifolium Smith, Washington.
Vaccinium scoparium Lieberg, Colorado, Idaho; Alberta.
Vaccinium vacillans Kalm, Arkansas, Connecticut, Delaware.
Vaccinium virgatum Ait., Virginia.

Insert: ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 305;* Grove, Brit. Rust Fungi *f. 277.*

Add the exsiccati: Barth. Fungi Columb. *2384, 2869, 4333, 4680, 5083;* Barth. N. Am. Ured. *378, 676, 1182, 1278, 1481, 2281, 2282, 2379, 2479, 2574, 2687, 3084;* Clements, Crypt. Form. Colo. *588;* Ellis, N. Am. Fungi *1023;* Ellis & Ev. N. Am. Fungi *2717;* Rav. Fungi Am. *731;* Seym. & Earle, Econ. Fungi *225a, b;* Thaxter, Rel. Farl. *278a, b, 280a, b.*

110. Insert:

9. **Pucciniastrum Galii** (Link) Ed. Fisch. Beitr. Krypt. Schweiz 2^2: 471. 1904.

Caeoma Galii Link, in Willd. Sp. Pl. 6^2: 21. 1825.
Melampsora guttata Schroet. Abh. Schles. Ges. Cultur **1869–72**: 26. 1872.
Uredo Sherardiae Rostr.; Thüm. Myc. Univ. *1348.* 1879.
Melampsora Galii Wint. in Rab. Krypt.-Fl. 1^1: 244. 1881.
Thekopsora Galii De-Toni, in Sacc. Syll. Fung. **7**: 765. 1888.
Caeoma Asperulae Rostr.; Lagerh. Tromsö Mus. Aarsh. **17**: 105. 1895.
Thekopsora guttata Sydow, Monog. Ured. **3**: 467. 1915.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered or grouped, round, minute, 0.1–0.2 mm. in diameter, yellow, opening by a central pore, long covered by the overarching epidermis; peridium hemispheric; peridial cells elongate at sides, the upper ones cuboid, delicate, the ostiolar cells 10–15 μ high, the walls 1.5–2.5 μ thick; urediniospores globoid or broadly ellipsoid, 11–16 by 16–24 μ; wall colorless, thin, 1–1.5 μ, sparsely and finely echinulate.

III. Telia amphigenous, small, inconspicuous, dark-brown; teliospores forming a single layer within the epidermal cells, globoid, 20–26 by 22–30 μ; wall cinnamon-brown, 1.5–2 μ thick, sometimes slightly thicker above, smooth.

ON RUBIACEAE:
Galium triflorum Michx., California, Colorado, Idaho, New York, Oregon; British Columbia.
TYPE LOCALITY: Berlin, Germany, on *Galium verum.*
DISTRIBUTION: Vancouver Island southward to central California, and eastward to central Colorado, with one locality in central New York; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 307;* Ber. Deuts. Bot. Ges. **14**: *pl. 9, f. 8, 9.*
EXSICCATI: Barth. N. Am. Ured. *1679, 2478.*

110. **MELAMPSORIDIUM.**

Insert the key:

Inner wall of peridium thick, 6–8 μ.	1. *M. Betulae.*
Inner wall of peridium thin, 2–4 μ.	
Urediniospores 25–50 μ long, without smooth spot.	2. *M. Alni.*
Urediniospores 18–28 μ long, with smooth spot.	3. *M. Carpini.*

110. **Melampsoridium Betulae.**

Under Pinaceae, substitute: *Larix laricina* (DuRoi) Koch (*L. americana* Michx.), Connecticut, Wisconsin.

Add the hosts, under Betulaceae:

Betula kenaica W. H. Evans, Alaska.
Betula occidentalis Hook., Idaho, Montana.
Betula papyrifera Marsh., Maine; Nova Scotia.

Add the illustrations: Briosi & Cavara, Funghi Paras. *31;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 30, f. b;* Grove, Brit. Rust Fungi *f. 267, 268.*

Add the exsiccati: Barth. Fungi Columb. *2534;* Barth. N. Am. Ured. *2213;* Thaxter, Rel. Farl. *232a–c.*

111. Insert:

2. **Melampsoridium Alni** (Thüm.) Dietel, in E. & P. Nat. Pfl. 1^{1**}: 551. 1900.

Melampsora Alni Thüm. Bull. Soc. Nat. Mosc. **53**: 226. 1878.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, loosely grouped on small, yellow spots, round, minute, 0.2–0.3 mm. in diameter, yellowish; peridium hemispheric, firm; peridial cells polygonal, small, 10–15 μ across, the outer wall thin, 1–2 μ, the inner wall somewhat thicker, 2–3 μ, the ostiolar cells extended into points, 20–35 μ long; urediniospores ovate-oblong or oblong-clavate, 9–15 by 25–50 μ; wall colorless, thin, about 1.5 μ, sparsely and finely echinulate, without smooth spot.

III. Telia hypophyllous, scattered or grouped, small, scarcely 0.5 mm. across, purplish- or blackish-brown; teliospores oblong, prismatic or clavate, in a palisade-like layer beneath the epidermis, 8–15 by 30–45 μ, rounded at each end; wall pale cinnamon-brown, thin, 1 μ, smooth.

ON BETULACEAE:
Alnus acuminata H.B.K., Guatemala.
Alnus jorullensis H.B.K., Guatemala.
Alnus rhombifolia Nutt., California.
Alnus rubra Bong. (*A. oregana* Nutt.), California.
TYPE LOCALITY: Mount Borus, southern Siberia, central Asia, on *Alnus viridis.*
DISTRIBUTION: Central California to Guatemala; also in eastern Asia, Japan, and South America.
ILLUSTRATIONS: Bot. Mag. Tokyo **11**: *pl. 4, f. 4–11;* Sydow, Monog. Ured. **3**: *pl. 18, f. 158.*

3. **Melampsoridium Carpini** (Nees) Dietel, in E. & P. Nat. Pfl. 1^{1**}: 551. 1900.

Caeoma Carpini Nees, Syst. Pilze 16. 1816.
Uredo Carpini Desmaz. Pl. Crypt. *674.* 1834.
Melampsora Carpini Fuckel, Jahrb. Nassau Ver. Nat. **23–24**: 44. 1870.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered or loosely grouped on small yellow spots, round, minute, 0.1–0.25 mm. in diameter, yellow; peridium hemispheric, firm; peridial cells polygonal, small, 8–12 μ across, the outer wall thin, 1–2 μ, the inner wall thicker, 3–4 μ, the ostiolar cells extended into long sharp points; urediniospores ovate-oblong or oblong-clavate, 8–14 by 18–28 μ; wall colorless, thin, 1–1.5 μ, sparsely and finely echinulate, except the apex, which is smooth.

III. Telia hypophyllous, scattered, small, 0.3–0.5 mm. across, yellow becoming yellowish-brown; teliospores oblong or clavate, 8–16 by 28–50 μ, rounded at each end; wall pale golden-brown, thin, 1 μ, smooth.

ON CORYLACEAE:
Ostrya virginiana (Mill.) K. Koch (*Carpinus virginiana* Mill.), New York.
TYPE LOCALITY: Basel, Switzerland, on *Carpinus Betulus.*
DISTRIBUTION: Adirondack Mountains, New York; also in Europe and Japan.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^{3}: *f. 321;* Briosi & Cavara, Funghi Paras. *209.*

111. **Melampsorella elatina.**

Omit " Newfoundland " after *Abies balsamea.*

Add the hosts, under Pinaceae:

Abies amabilis (Dougl.) Forbes (*Picea amabilis* Dougl.), Washington.
Abies grandis Lindl., Idaho, Oregon; British Columbia.

Add the hosts, under Caryophyllaceae:

Alsine borealis (Bigel.) Britton (*Stellaria borealis* Bigel.), New York, Oregon, Utah, Washington.
Alsine longifolia (Muhl.) Britton (*Stellaria longifolia* Muhl.), Michigan, Pennsylvania.
Alsine longipes (Goldie) Cov. (*Stellaria longipes* Goldie), Alaska, California; Alberta.
Alsine media L. (*Stellaria media* Cyrill.), Maine, New Hampshire.
Cerastium alpinum L., British Columbia.
Cerastium arvense L., Alaska, Montana.
Cerastium Beeringianum Cham. & Schlecht., Colorado, Montana, Utah, Wyoming; British Columbia.
Cerastium scopulorum Greene, Utah.

Add the illustrations: Briosi & Cavara, Funghi Paras. *165;* Ber. Deuts. Bot. Ges. **27**: *pl. 14, f. 7;* E. & P. Nat. Pfl. 1^{1**}: *f. 52;* Grove, Brit. Rust Fungi *f. 269, 270;* Bot. Gaz. **77**: *pl. 4, f. 29, 30.*

Omit the exsiccati: Ellis & Ev. Fungi Columb. *2232.*

Add the exsiccati: Barth. Fungi Columb. *2232, 3045;* Barth. N. Am. Ured. *1418, 1724, 1919, 2022, 2419, 2921, 3118;* Garrett, Fungi Utah. *127, 207;* Thaxter, Rel. Farl. *231, 236.*

112. **HYALOPSORA.**

The genus should follow *Milesia,* and becomes no. 10. In the description of the genus, the key to species, and the descriptions of the four species which follow, the terms " aecia " and " aeciospores " should be understood as applying to the large-sized form of uredinia and urediniospores.

Replace the first paragraph describing the genus by:

Cycle of development includes pycnia, aecia, two forms of uredinia, and telia, with distinct alternating phases; heteroecious. Pycnia, aecia and uredinia subepidermal, telia within epidermal cells.

Pycnia depressed-conoidal or lenticular in section, without ostiolar filaments.

Aecia erumpent, definite. Peridium cylindric, colorless or nearly so, with medium-thick walls. Aeciospores globoid or ellipsoid; wall colorless, thin, verrucose.

112. **Hyalopsora Aspidiotus.**

Add the synonyms: *Peronospora Filicum* Rab. Fungi Eur. *848.* 1865. *Uredinopsis Polypodii-Dryopteridis* Liro, Bidr. Finl. Nat. Folk **65**: 498. 1908. *Peridermium pycnoconspicuum* Bell, Bot. Gaz. **77**: 25. 1924.

Insert after the synonymy:

O. Pycnia on two-year old leaves chiefly, hypophyllous, on slightly yellowish spots, usually in two rows, rounded or ellipsoid, yellowish-brown becoming darker, in section transversely lenticular, 300–360 μ broad, 100–150 μ high; pycniospores globoid, colorless, about 3 μ in diameter.

I. Aecia on three-year old leaves, hypophyllous, on yellowish spots, usually in two rows, cylindric or nearly so, 0.5–0.8 mm. in diameter, 1 mm. high, deep-seated; peridium colorless becoming yellowish; peridial cells angularly isodiametric in face view, 16 by 26 μ in diameter, rhomboidal in section, strongly overlapping, the outer wall 4–5 μ thick, smooth, the inner wall thicker, 6–8 μ, conspicuously verrucose; aeciospores globoid or broadly ellipsoid, 16–19 by 21–25 μ; wall colorless, thin, 1 μ or less, very finely and closely verrucose.

On Pinaceae:
Abies balsamea (L.) Mill., Ontario, Quebec.

In the description of the species under I, before the words " indistinctly verrucose," insert the words " smooth or "; similarly under II, before the words " minutely verrucose," insert " smooth or."

Add the illustrations: Grove, Brit. Rust Fungi *f. 279;* Sydow, Monog. Ured. **3**: *pl. 22, f. 167;* Bot. Gaz. **77**: 11. *f. 1, 2; pl. 4, f. 21, 27, 28; pl. 5, f. 35–37.*

Add the exsiccati: Barth. N. Am. Ured. *311, 1414, 2914*; Thaxter, Rel. Farl. *228.*

112. **Hyalopsora Polypodii.**

Add the synonyms: *Pucciniastrum* ? *Filicum* P. Karst. Bidr. Finl. Nat. Folk **31**: 57. 1879. *Pucciniastrum Polypodii* Dietel, Hedwigia Beibl. **38**: 260. 1899. *Uredinopsis Polypodii* Liro, Bidr. Finl. Nat. Folk **65**: 496. 1908.

Omit the first host.

Add the illustrations: Grove, Brit. Rust Fungi *f. 280;* Ber. Deuts. Bot. Ges. **27**: *pl. 14, f. 1, 2.*

Add the exsiccati: Barth. Fungi Columb. *3331;* Barth. N. Am. Ured. *1616, 2722;* Garrett, Fungi Utah. *74.*

113. **Hyalopsora laeviuscula.**

Add the host: *Polystichum munitum* (Kaulf.) Presl (*Aspidium munitum* Kaulf.), Oregon.

Add: EXSICCATI: Barth. N. Am. Ured. *1505.*

113. **Hyalopsora Cheilanthis.**

Add the synonym: *Hyalopsora Pasadenae* Sydow, Monog. Ured. **3**: 501. 1915.

Add the hosts:

Notholaena sinuata (Sw.) Kaulf. (*Acrostichum sinuatum* Sw.), New Mexico.
Pellaea flexuosa (Kaulf.) Link, Texas.
Pellaea glabella Mett., California.

113. **CALYPTOSPORA.**

This genus becomes no. 7, following *Melampsorella.*

114. **Calyptospora columnaris.**

Add the synonym: *Uredo columnaris* Spreng. Syst. Veg. **4**: 570. 1827.

Replace the line below the synonymy by the following:

O. Pycnia epiphyllous, few, hemispheric, low, inconspicuous, small, 80–140 μ broad by 25–30 μ high.

Replace the line under Pinaceae by:

Abies amabalis (Loud.) Forbes, Washington.
Abies balsamea (L.) Mill., Wisconsin; Nova Scotia, Quebec.
Abies lasiocarpa (Hook.) Nutt. (*A. subalpina* Engelm.), Colorado, Idaho, Montana, Wyoming; British Columbia.
Abies magnifica Murr., California, Oregon.

Add the hosts, under Vacciniaceae:

Vaccinium caespitosum Michx., Montana.
Vaccinium ovalifolium Smith, California, Oregon.
Vaccinium scoparium Leiberg (*V. erythrococcum* Rydb.), Colorado, Montana, New Mexico, Oregon; Alberta.

Add the illustrations: Grove, Brit. Rust Fungi *f. 278;* Sydow, Monog. Ured. **3**: *pl. 20, f. 163;* Bull. Penn. Exp. Sta. 160: *f.* 9^{A}.

Add the exsiccati: Barth. Fungi Columb. *3104, 4609, 4610;* Barth. N. Am. Ured. *10, 104, 303, 403, 1203, 1204, 1704, 1705, 2107, 2611;* Clements, Crypt. Form. Colo. *589;* Thaxter, Rel. Farl. *210.*

114. **NECIUM.**

This genus becomes no. 1b, following *Melampsora* and *Aplopsora* (see page 672).

Replace, in the first line, " fill epidermal cells " by " are subepidermal."

114. **Necium Farlowii.**

Add the synonyms: *Chrysomyxa Farlowii* Sacc. & Trav.; Sacc. Syll. Fung. **19**: 284. 1910. *Melampsora Farlowii* J. J. Davis, Trans. Wis. Acad. **18**: 107. 1915.

Omit, in the description of the telia, the words " in the enlarged epidermal cells."

Add: ILLUSTRATIONS: Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 32, f. 5;* Sydow, Monog. Ured. **3**: 395.

115. **UREDINOPSIS.**

The genus becomes no. 8, following *Calyptospora.*

In the description of the genus, the key to species, and the descriptions of the seven species which follow, the terms " aecia " and " aeciospores " should be understood as applying to the uredinia with rounded urediniospores in distinction to the form with pointed urediniospores.

Replace the first paragraph by:

Cycle of development includes pycnia, aecia, two forms of uredinia, and telia, with distinct alternating phases; heteroecious. Pycnia subcuticular, aecia and uredinia subepidermal, telia rudimentary, the teliospores solitary, scattered in the mesophyll, segregated beneath the epidermis, or rarely within the epidermal cells.

Pycnia flattened-hemispheric, rising little above the leaf-surface, and extending between the cells and depressing the tissues beneath, often appearing subepidermal, without ostiolar filaments.

Aecia erumpent, deep-seated, definite, colorless. Peridium cylindric, with medium-thick walls. Aeciospores ellipsoid or globoid; wall colorless, thin, verrucose.

115. In the key.

For " *Pteridis* " read " *macrosperma.*"

Omit the last line.

115. **Uredinopsis Osmundae.**

Insert:

O and I. Pycnia and aecia differing little if any from those described below for *Uredinopsis mirabilis.*

ON PINACEAE:

Abies balsamea (L.) Mill., Iowa, Michigan, New Hampshire, New York, Wisconsin; Nova Scotia.

Add the illustrations: Bot. Gaz. **77**: *pl. 3, f. 20; pl. 4, f. 23, 24.*

Add: EXSICCATI: Barth. N. Am. Ured. *2981;* Ellis, N. Am. Fungi *1025;* Thaxter, Rel. Farl. *234, 284;* Thüm. Myc. Univ. *2228.*

115. **Uredinopsis mirabilis.**

Add the synonyms: *Peridermium balsameum* Peck, Ann. Rep. N. Y. State Mus. **27**: 104. 1875. *Aecidium balsameum* Dietel, in E. & P. Nat. Pfl. **1**^{1}**: 78. 1897.

Insert the following description of pycnia and aecia:

O. Pycnia chiefly hypophyllous, few, scattered, inconspicuous, raised slightly above the leaf-surface, hemispheric, extending between and depressing the tissues beneath giving the appearance of being subepidermal, lenticular in section, small, 100–130 μ broad by 35–50 μ high; pycniospores ellipsoid.

I. Aecia hypophyllous, usually on leaves of the season, in two irregular rows on yellowish spots occupying part or all of the leaf, white even before spores are discharged, deep-seated, cylindric, 0.2–0.5 mm. in diameter, opening at apex; peridium colorless, the margin erect, erose or somewhat lacerate; peridial cells polygonal or angularly ellipsoid in face view, oblong or rectangular in side view, somewhat overlapping, 10–16 by 35–53 μ, the outer wall 1–3 μ thick, smooth, the inner wall 4–7 μ thick, prominently but finely tuberculate-verrucose; aeciospores broadly ellipsoid or globoid, 16–26 by 19–29 μ; wall colorless, thin, 1–2 μ, coarsely and closely verrucose.

ON PINACEAE:

Abies balsamea (L.) Mill., Connecticut, Massachusetts, Michigan, Minnesota, New York, Vermont, Wisconsin; Newfoundland, Nova Scotia, Ontario.

Add the illustration: Bot. Gaz. **77**: *pl. 4, f. 25, 26.*

Add the exsiccati: Barth. Fungi Columb. *4086;* Barth. N. Am. Ured. *880, 1013, 2980;* Thaxter, Rel. Farl. *282a–c;* Sydow, Ured. *2446.*

116. **Uredinopsis Pteridis.**

Reduce this name to synonymy and substitute: **Uredinopsis macrosperma** (Cooke) Magn. Hedwigia **43**: 122. 1904.

Add the synonyms: *Uredo macrospermum* Cooke, Grevillea **8**: 71. 1879. *Aecidium pseudo-balsameum* Dietel & Holway, Erythea **7**: 98. 1899. *Peridermium pseudo-balsameum* Arth. & Kern, Bull. Torrey Club **33**: 430. 1906. *Uredinopsis Pteridis congensis* P. Henn. in DeWild. Ét. Fl. Bas-Congo **2**: 92. 1907. *Milesina Pteridis* Sydow, Monog. Ured. **3**: 481. 1915.

Insert:

O. Pycnia hypophyllous, rather numerous, inconspicuous, scattered, only slightly raised above the leaf-surface, subcuticular, hemispheric, extending between and very greatly depressing the tissues beneath giving the appearance of being globoid and subepidermal, 160–180 μ broad by 100–170 μ high.

I. Aecia hypophyllous, usually on leaves of the previous season, in two rows on yellow spots occupying part or all of the leaf, white even before spores are discharged, deep-seated, cylindric, 0.4–0.6 mm. in diameter by 0.7–1 mm. high; peridium colorless, the margin erect, erose or deeply lacerate; peridial cells polygonal or angularly ellipsoid in face view, oblong or rectangular in side view, somewhat overlapping, 12–25 by 30–50 μ, the outer wall 1–1.5 μ thick, the inner wall 4–10 μ thick including tubercles, very strongly tuberculately verrucose; aeciospores broadly ellipsoid or globoid, 16–22 by 20–32 μ; wall colorless, moderately thick, 1.5–2.5 μ, finely and closely verrucose. Pseudospores often present, usually larger than aeciospores, with very thick walls, and small lumen.

ON PINACEAE:
Abies amabilis (Loud.) Forbes, Washington.
Abies grandis Lindl., California, Idaho, Montana, Oregon, Washington.
Abies nobilis Lindl., Oregon.

II. Uredinia (so-called "aecia" form) hypophyllous, scattered, roundish or oblong, usually small, 0.2–0.8 mm. across, yellow on yellowish or brownish spots; peridium delicate; urediniospores obovate or broadly ellipsoid, more or less angular, 14–26 by 26–45 μ; wall colorless, moderately thin, 1.5–2 μ, closely and rather finely verrucose.

Replace the list of hosts under Polypodiaceae by the following:

Pteridium aquilinum (L.) Kuhn (*P. latiusculum* Maxon, *Pteris aquilina* L.), Arkansas, Georgia, Maryland, Mississippi, New Jersey, North Carolina, South Carolina, Tennessee, Virginia.
Pteridium aquilinum pubescens Underw., California, Montana, New Mexico, Oregon, Washington; British Columbia.
Pteridium caudatum (L.) Maxon (*Pteris caudata* L., *P. aquilina caudata* Hook.), Florida, Georgia; Bermuda.

Change the type locality to read: Natal, South Africa, on *Pteris* sp.

Change the distribution to read: Western Canada, western, southern and southeastern United States, and Bermuda; also in South America, Hawaii, eastern Europe, eastern Asia, and Africa.

Add the illustrations: Hedwigia Beibl. **39**: 130. *f. 3;* Mém. Soc. Neuch. Sci. Nat. **5**: 554. *f. 63;* Sydow, Monog. Ured. **3**: *pl. 22, f. 166.*

Add: EXSICCATI: Barth. Fungi Columb. *2988, 4087, 4492, 4787;* Barth. N. Am. Ured. *881, 1383, 1485, 1619, 1682, 2182, 2383, 2579, 2784, 3179.*

116. **Uredinopsis Copelandi.**

Incorporate the name, synonym, and descriptions given on page 117 for *Uredinopsis Atkinsonii* with those of *U. Copelandi.*

Insert:

O and I. Pycnia and aecia differing little if any from those described above for *Uredinopsis mirabilis.*

ON PINACEAE:
Abies balsamea (L.) Mill., Michigan; Nova Scotia.
Abies grandis Lindl., Idaho, Oregon, Washington.
Abies lasiocarpa Nutt., Idaho, Washington.

Add the host, under Polypodiaceae: *Filix bulbifera* (L.) Underw. (*Cystopteris bulbifera* Bernh.), Indiana, New York, Wisconsin; Ontario.

Add the exsiccati: Barth. Fungi Columb. *3087, 4085, 4491;* Barth. N. Am. Ured. *879, 1089, 3114;* Thaxter, Rel. Farl. *283a–c;* Sydow, Ured. *2447.*

116. **Uredinopsis Struthiopteridis.**

Change the type locality to read: Maerradalen, near Christiania, Norway.

Add the illustrations: Zeits. Pflanzenkr. **26**: 265. *f. 1.*

Add: EXSICCATI: Barth. N. Am. Ured. *3280;* Thaxter, Rel. Farl. *285.*

117. **Uredinopsis Phegopteridis.**

Insert:

O and I. Pycnia and aecia differing little if any from those described above for *Uredinopsis mirabilis.*

ON PINACEAE:
Abies balsamea (L.) Mill., Nova Scotia.

Add: ILLUSTRATIONS: Bot. Gaz. **77**: 15, *f. 3–10; pl. 1, 2; pl. 4, f. 22.*

117. **Uredinopsis Atkinsonii.**

All that is given under this name is to be placed under 4. **U. Copelandi,** as stated above.

117. Insert, to follow **Uredinopsis**:

9. MILESIA F. B. White, Scott. Nat. **4**: 162. 1877.

Milesina Magn. Ber. Deuts. Bot. Ges. **27**: 325. 1909.

Cycle of development includes pycnia, aecia, uredinia, and telia, with distinct alternating phases; heteroecious. Pycnia, aecia and uredinia subepidermal, telia in epidermal cells.

Pycnia globoid in section, without ostiolar filaments.

Aecia erumpent, definite, cylindric. Peridium colorless, with thin-walled cells. Aeciospores ellipsoid; wall colorless, thin, verrucose.

Uredinia dimorphic, but only one form known in each species, bullate, covered by the epidermis, dehiscent by a central pore. Peridium hemispheric, with cells elongate at sides and polygonal above. Urediniospores apparently borne singly on pedicels, globoid, oblong, or fusiform; wall colorless, spinulosely and sparingly echinulate, or smooth, the pores obscure.

Teliospores globoid or irregular, 2–6-celled, the septa more or less vertical; wall smooth, colorless, thin.

Type species, *Milesia Polypodii* F. B. White (on *Polypodium vulgare*).

Urediniospore-echinulation strongly developed.	
Urediniospores beaked.	1. *M. pycnograndis.*
Urediniospores beakless.	
Urediniospores large, 26–55 μ long.	
Urediniospore-wall thin, 1–2 μ.	2. *M. Kriegeriana.*
Urediniospore-wall medium-thick, 1.5–2.5 μ.	3. *M. Polystichi.*
Urediniospores small, 25–29 μ long.	
Urediniospore-wall thin, 1–2 μ.	4. *M. australis.*
Urediniospore-wall medium-thick, 1.5–2.5 μ.	5. *M. consimilis.*
Urediniospore-echinulation weakly developed.	6. *M. columbiensis.*

1. Milesia pycnograndis (Bell) Arthur.

Peridermium pycnograndе Bell, Bot. Gaz. **77**: 24. 1924.
Uredinopsis polypodophila Bell, Bot. Gaz. **77**: 25. 1924.

O. Pycnia hypophyllous, few, alternating with aecia in two rows, forming distinct but not conspicuous, light-colored areas, subepidermal, deep-seated, oblong or globoid, 180–250 μ in transverse diameter; pycniospores obovoid or oblong, 2.5–3.2 by 3.5–7 μ.

I. Aecia hypophyllous, on leaves two years and more old, in two rows on either side of midrib, cylindric, rather large, 0.25–0.3 mm. in diameter, to 1 mm. high; peridium

colorless, thin, firm, rupturing at apex, margin lacerate; peridial cells narrowly rhomboidal, slightly overlapping, 13–16 by 37–45 μ, the outer wall thin, 1–1.5 μ, smooth, the inner wall thicker, 2.5–3.5 μ, prominently tuberculate-rugose; aeciospores broadly ellipsoid, 18–22 by 24–30 μ; wall colorless, thin, 1–1.5 μ, closely verrucose.

ON PINACEAE:

Abies balsamea (L.) Mill., Ontario, Quebec.

II. Uredinia hypophyllous, minute, 0.2–0.4 mm. in diameter, pale yellowish-brown, the spores exuded in white, slender, filiform masses; peridium delicate, irregularly dehiscent; urediniospores fusiform-obovoid or fusiform, 15–23 by 45–55 μ, acute or acuminate above into a beak 5–12 μ long, narrowed below; wall colorless, thin, 1 μ, smooth or with a few inconspicuous spinose points.

III. Telia hypophyllous, occupying large brown spots; teliospores packed within the epidermal cells but not distending them, irregularly globoid or oblong, 2–8-celled, with vertical septa, 24–45 μ broad by 16–27 μ high; wall colorless, very thin, less than 1 μ, smooth.

ON POLYPODIACEAE:

Polypodium vulgare L., Ontario.

TYPE LOCALITY: Lake Timagami, Ontario, Canada, on *Abies balsamea*.
DISTRIBUTION: Northern Ontario and northward.
ILLUSTRATION: Bot. Gaz. **74**: *pl. 3, f. 16–19, 38, 39.*

2. **Milesia Kriegeriana** (Magn.) Arth. Mycologia **7**: 176. 1915.

Melampsorella Kriegeriana Magn. Ber. Deuts. Bot. Ges. **19**: 581. 1901.
Milesina Kriegeriana Magn. Ber. Deuts. Bot. Ges. **27**: 325. 1909.

O. Pycnia hypophyllous, abundant, immersed, globoid in section, more or less flattened next to the epidermis, 85–160 μ broad by 65–125 μ high.

I. Aecia hypophyllous, on leaves two years and more old, in two rows, bullate, 0.4–0.5 mm. in diameter, 0.2 mm. high; peridium colorless, delicate; peridial cells oblong, 15–20 by 18–32 μ, the walls 2–3 μ thick; aeciospores globoid or broadly ellipsoid, 13–18 by 15–25 μ; wall colorless, thin, finely verrucose.

ON PINACEAE:

Abies balsamea (L.) Mill., Ontario.

II. Uredinia hypophyllous, scattered, inconspicuous, punctate, covered by the epidermis, round, minute, about 0.1 mm. in diameter, finally opening by a central pore, yellow; peridium hemispheric, colorless; peridial cells elongate at sides, polygonal above, 9–15 μ across, the wall about 2 μ thick; urediniospores ellipsoid, or obovoid, 15–20 by 27–42 μ; wall colorless, thin, 1–2 μ, strongly and very sparsely echinulate, the points about 1.5 μ long.

III. Telia hypophyllous; teliospores within the epidermal cells, globoid or oblong, 2–8-celled, with vertical septa, 14–18 by 14–26 μ; wall colorless, thin, 1 μ, smooth.

ON POLYPODIACEAE:

Dryopteris marginalis (L.) A. Gray (*Aspidium marginale* Sw.), New York; Ontario, Quebec.
Dryopteris spinulosa (Müll.) Kuntze (*Aspidium spinulosum* Sw.), Ontario.
TYPE LOCALITY: Königstein, Germany, on *Aspidium spinulosum*.
DISTRIBUTION: Eastern Quebec southwestward to central New York; also in Europe.
ILLUSTRATION: Ber. Deuts. Bot. Ges. **19**: *pl. 33.*

3. **Milesia Polystichi** Wineland; H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 214. 1918.

Milesina Polystichi Grove, Jour. Bot. **59**: 109. 1921.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, bullate, roundish, 0.2–0.3 mm. across, prominent; peridium hemispheric, firm; peridial cells colorless, elongate at sides, about 21 μ long, polygonal above, about 7 μ across, the walls 2.5 μ thick; urediniospores obovoid or

oblong, 18–23 by 26–35 μ; wall colorless, moderately thick, 1.5–2.5 μ, strongly and very sparsely echinulate.

III. Telia unknown.

ON POLYPODIACEAE:
Polystichum munitum (Kaulf.) Presl (*Aspidium munitum* Kaulf.), California, Idaho, Montana, Oregon, Washington.
TYPE LOCALITY: Grant's Pass, Josephine County, Oregon, on *Polystichum munitum*.
DISTRIBUTION: Northern California to northwestern Montana and northward; also in Europe.

4. **Milesia australis** Arth. Bull. Torrey Club **51**: 53. 1924.

Uredo Blechni Dietel & Neger, Bot. Jahrb. **22**: 358. 1896. Not *Milesia Blechni* Arth. 1922.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, or loosely grouped on brown areas, noticeable, pustular, roundish, 0.1–0.2 mm. in diameter, covered by the epidermis, finally opening by a central pore; peridium hemispheric, colorless, delicate; peridial cells elongate at sides, polygonal above, small, the wall about 1 μ thick; urediniospores irregularly ellipsoid or obovoid, 15–19 by 21–27 μ; wall colorless, thin, 1–2 μ, noticeably and sparsely echinulate, the points short.

III. Telia unknown.

ON POLYPODIACEAE:
Blechnum occidentale L., Porto Rico.
ON SCHIZAEACEAE:
Lygodium polymorphum (Cav.) H.B.K., Salvador.
TYPE LOCALITY: Concepcion, Peru, on *Blechnum hastatum*.
DISTRIBUTION: Southern Salvador and Porto Rico; also in South America.

5. **Milesia consimilis** Arth. Mycologia **7**: 176. 1915.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, or loosely grouped on discolored spots, noticeable, bullate, round, 0.2–0.3 mm. in diameter, covered by the epidermis, finally opening by a central pore, yellow; peridium hemispheric, colorless, delicate; peridial cells elongate at sides, polygonal above, small, the wall about 1 μ thick; urediniospores ellipsoid or obovoid, 16–21 by 26–29 μ; wall colorless, moderately thick, 1.5–2.5 μ, strongly and sparingly echinulate, the points short and blunt, about 1 μ long.

III. Telia unknown.

ON POLYPODIACEAE:
Dryopteris patens (Sw.) Kuntze, Jamaica.
TYPE LOCALITY: Whitfield Hall, Jamaica, on *Dryopteris patens*.
DISTRIBUTION: Known only from the type locality.

6. **Milesia columbiensis** (Dietel) Arth. Mycologia **7**: 175. 1915.

Milesina columbiensis Dietel; Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 559. 1913.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, grouped on yellowish- or reddish-brown spots 1–2 mm. across, small, round, 0.1–0.2 mm. across, tardily dehiscent by a central pore, peridium hemispheric, colorless, fragile; peridial cells elongate at sides, polygonal above, the wall about 1 μ thick; urediniospores ellipsoid or obovoid, 16–21 by 23–27 μ; wall colorless, thin, 1–1.5 μ, rather closely echinulate, the points small.

III. Telia unknown.

ON POLYPODIACEAE:
Nephrolepis rivularis (Vahl) Urban, Porto Rico.
TYPE LOCALITY: Quebradas, between Angelopolis and Guaca, Colombia, on *Nephrolepis pendula*.
DISTRIBUTION: Porto Rico; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 559. *f. 67.*

118. In the key.

Insert, between the first and second lines:

Telial host belonging to family Ilicaceae. . . 1*a*. *M. ilicina*.

For "*Arctostaphyli*" read "*roanensis*."

118. **Melampsoropsis Empetri.**

Add: EXSICCATI: Barth. N. Am. Ured. *3023.*

118. Insert:

1a. **Melampsoropsis ilicina** (Ellis & Ev.) Arthur.

Aecidium ilicinum Ellis & Ev. Bull. Torrey Club **24**: 284. 1897.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, soon naked, roundish or irregular, 0.5–0.8 mm. across, pulverulent, ruptured epidermis conspicuous; peridium not seen, possibly wanting; urediniospores broadly ellipsoid, sometimes angular, 19–21 by 23–29 μ; wall colorless, 1–1.5 μ thick, finely and rather closely verrucose.

III. Telia hypophyllous, arising in the uredinia or separately, similar to the uredinia in gross characters; teliospores irregularly ellipsoid or oblong, 13–23 by 23–32 μ, in a series 112–160 μ long; wall colorless, thin, about 1 μ, smooth.

ON ILICACEAE:
Ilex opaca Ait., West Virginia.
TYPE LOCALITY: Nuttallburg, West Virginia, on *Ilex opaca.*
DISTRIBUTION: Mountains of central West Virginia.

118. **Melampsoropsis Pyrolae.**

Change the number of the volume and page of the fifth synonym to read **5**: 127, and add the synonyms: *Aecidium conorum-Abietis* Reess, Tagebl. Vers. Deuts. Naturf. **42**: 189. 1868. *Aecidium conorum-Piceae* Reess, Abh. Nat. Ges. Halle **11**: 102. 1869. *Peridermium conorum* Thüm. Mitth. Forstl. Vers. Oest. **2**: 313. 1880. *Peridermium Engelmanni* Thüm. Mitth. Forstl. Vers. Oest. **2**: 314. 1880. *Aecidium Engelmanni* Dietel, in E. & P. Nat. Pfl. 1^{1**}: 79. 1897. *Peridermium conorum-Piceae* Arth. & Kern, Bull. Torrey Club **33**: 431. 1906. *Chrysomyxa Ramischiae* Lagerh. Sv. Bot. Tidskr. **3**: 26. 1909.

Replace the line below the synonymy by:

O. Pycnia episquamous, numerous, flat, forming continuous layers, 600–900 μ broad, 50–100 μ high, inconspicuous, not noticeably elevated above the surface.

I. Aecia chiefly episquamous, forming bullate swellings, irregularly round, large, crowded and often confluent, finally rupturing the epidermis, pulverulent; peridium irregularly convex, soon dropping away; peridial cells broadly ellipsoid or globoid, loosely united, coarsely tuberculate, resembling the spores; aeciospores broadly ellipsoid or obovoid, variable in size, large, 20–27 by 25–40 μ; wall colorless, thick, 4–5 μ including the tubercles, very coarsely and rather closely tuberculate, tessellate with depressed warts 3–4 μ across.

ON PINACEAE:
Picea canadensis (Mill.) B.S.P. (*P. alba* Link, *Abies canadensis* Mill.), Maine; Manitoba.
Picea Engelmanni (Parry) Engelm., Colorado, Montana, Oregon.
Picea excelsa (Lam.) Link (*P. Abies* Karst., *P. vulgaris* Link, *Pinus Abies* L.), Massachusetts.
Picea mariana (Mill.) B.S.P. (*P. nigra* Ait.), Maine, New Hampshire.
Picea rubens Sarg. (*P. rubra* Dietr.), Maine, New York, Vermont; Nova Scotia.

Omit Pennsylvania after *Pyrola asarifolia.*

Add the hosts, under Pyrolaceae:

Moneses reticulata Nutt., Alaska.
Pyrola bracteata Hook., Alaska; British Columbia.
Pyrola picta Smith, New Mexico.

Insert: ILLUSTRATIONS: Abh. Nat. Ges. Halle **11**: *pl. 2, f. 1–4;* Flora **74**: *pl. 5, f. 9;* Grove, Brit. Rust Fungi *f. 236, 237;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 30, f. a;* Sv. Bot. Tidskr. **3**: 26. *f. 2;* Beitr. Krypt. Schweiz 2^2: *f. 327.*

Add to the exsiccati: Barth. N. Am. Ured. *216, 317, 1012, 1725, 1726;* Clements, Crypt. Form. Colo. *587;* Garrett, Fungi Utah. *72, 73;* Thaxter, Rel. Farl. *214;* Seym. & Earle, Econ. Fungi *220.*

119. **Melampsoropsis ledicola.**

Add the synonyms: *Peridermium decolorans* Peck, Ann. Rep. N. Y. State Mus. **27**: 104. 1875. *Peridermium abietinum decolorans* Thüm. Mitth. Forstl. Vers. Oest. **2**: 321. 1880. *Aecidium decolorans* Farl. Bibl. Index **1**: 38. 1905.

Replace the line below the synonymy by:

O. Pycnia amphigenous, numerous, in two rows on each leaf-face, prominent, punctiform, honey-yellow becoming reddish-brown, flask-shaped, 105–145 μ broad.

I. Aecia hypophyllous, in two rows on yellowish spots occupying all or part of leaf, compressed, 0.5–3 mm. long, 0.5 mm. high or less; peridium fragile, the margin finely lacerate; peridial cells colorless, abutted or sometimes slightly overlapping, the outer wall thin, 2–3 μ, smooth, the inner wall transversely striate, thick, 8–12 μ, moderately verrucose; aeciospores broadly ellipsoid or globoid, very large, 22–40 by 27–55 μ; wall colorless, thick, 3–6 μ, densely and coarsely verrucose.

On Pinaceae:
Picea canadensis (Mill.) B.S.P. (*P. alba* Link, *Abies canadensis* Mill.), Alaska; Nova Scotia, Quebec.
Picea Engelmanni (Parry) Engelm., Alberta.
Picea mariana (Mill.) B.S.P. (*P. nigra* Ait.), Maine, New Hampshire, New York, Wisconsin; Manitoba, Newfoundland, Nova Scotia, Quebec.
Picea pungens Engelm., Ontario.
Picea rubens Sarg. (*P. rubra* Dietr.), New Hampshire, New York; Nova Scotia, Prince Edward Island.
Picea sitchensis (Bong.) Carr., Alaska, Washington.

Change the second host under Ericaceae to read: *Ledum decumbens* (Ait.) Lodd. (*L. palustre angustifolium* Hook.), Alaska; Labrador.

Add the exsiccati: Barth. Fungi Columb. *3044, 3152;* Barth. N. Am. Ured. *113, 3024;* Ellis, N. Am. Fungi *1024;* Rab.-Wint. Fungi Eur. *3607;* Thaxter, Rel. Farl. *213, 235;* Sydow, Ured. *2400;* Vesterg. Micr. Rar. Sel. *1253, 1257.*

119. **Melampsoropsis Cassandrae.**

Add the synonym: *Peridermium consimile* Arth. & Kern, Bull. Torrey Club **33**: 427. 1906.

Replace the line below the synonymy by:

O. Pycnia amphigenous, numerous, scattered, prominent, punctiform, honey-yellow becoming blackish-brown, globoid or flask-shaped, almost wholly immersed, 110–150 μ broad.

I. Aecia chiefly hypophyllous, in two irregular rows on yellowish spots occupying all or part of leaf, compressed, 0.5–1.5 mm. long, 0.5–0.8 mm. high; peridium delicate, the margin lacerate; peridial cells colorless, abutted or slightly overlapping, the outer wall thin, 1–2 μ, smooth, the inner wall transversely striate, thicker, 2–3.5 μ, finely and closely verrucose; aeciospores broadly ellipsoid or globoid, 16–30 by 24–35 μ; wall colorless, moderately thick, 1.5–2 μ, densely and finely verrucose.

On Pinaceae:
Picea mariana (Mill.) B.S.P. (*P. nigra* Ait.), Connecticut, Maine, Michigan, Minnesota, New York, Vermont, Wisconsin; Nova Scotia, Ontario.
Picea pungens Engelm., Ontario.
Picea rubens Sarg. (*P. rubra* Dietr.), Michigan, New York; Ontario.
Picea sp., British Columbia.

Omit, under Ericaceae, the three lines beginning *Pieris mariana, Pieris nitida* and *Xolisma ligustrina,* these hosts having been transferred to *Pucciniastrum Myrtilli* (page 679).

Insert: Illustration: Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 30, 32, f. 1*[4].

Omit the exsiccati: Ellis & Ev. N. Am. Fungi *2717;* Seym. & Earle, Econ. Fungi *486;* Rav. Fungi Am. *731.*

Add the exsiccati: Barth. N. Am. Ured. *215, 719, 913, 3022;* Sydow, Ured. *2445.*

119. **Melampsoropsis abietina.**

In the description of aecia (on page 120) correct the statement regarding the walls of the peridial cells to read thus: "outer wall thin, 1–1.5 μ, smooth, inner wall moderately thick, 5–7 μ, moderately verrucose;" and change the aeciospore-wall to "1.5–2.5 μ, moderately verrucose."

Substitute, for the line under Pinaceae:

Picea mariana (Mill.) B.S.P. (*P. nigra* Ait.), New Hampshire.
Picea rubens Sarg. (*P. rubra* Dietr.), Nova Scotia.

Add the exsiccati: Barth. N. Am. Ured. *2625;* Thaxter, Rel. Farl. *212, 233.*

120. **Melampsoropsis Arctostaphyli.**

Becomes a synonym of **Chrysomyxa Arctostaphyli** (page 691); in its place insert the following:

6. **Melampsoropsis roanensis** Arth. Bull. Torrey Club **49**: 190. 1922.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, in crowded groups of 2–8 on somewhat discolored spots, roundish or ovoid, 0.3–0.8 mm. long, prominent, early dehiscent by a central or lateral slit, leaving a border or a cap-like covering of epidermis, pulverulent; peridium delicate, uniform in thickness; urediniospores catenulate, ellipsoid, 20–26 by 32–40 μ; wall colorless, 1.5–2.5 μ thick, closely and finely verrucose on one side, grading to coarsely verrucose on opposite side with somewhat deciduous, cylindric tubercles, 2 μ long.

III. Telia hypophyllous, in irregular and often confluent groups on reddish spots, roundish or ovoid, 0.5–1 mm. across, elevated, prominent, waxy, orange-red, tardily naked; teliospores cuboid, 16–20 μ broad, almost or quite as long, in a series 65–100 μ long; wall colorless, thin, 1 μ, smooth.

ON ERICACEAE:
Rhododendron catawbiense Michx., Tennessee.
Rhododendron punctatum Andr., Tennessee.
TYPE LOCALITY: LeConte Mountain, Sevier County, Tennessee, on *Rhododendron punctatum.*
DISTRIBUTION: Tennessee, on mountain summits above 1800 meters.

120. **Melampsoropsis Piperiana.**

Insert the synonym: *Caeoma Piperianum* Sacc. & Trott. in Sacc. Syll. Fung. **21**: 787. 1912.

121. Insert:

11a. CHRYSOMYXA Unger, Beitr. Vergl. Pathol. 24. 1840.

Cycle of development includes telia, and possibly pycnia. Telia subepidermal.

Pycnia unknown, possibly not formed.

Telia erumpent, definite, roundish, waxy. Teliospores catenulate, one-celled, oblong or cuboid; wall colorless, thin, smooth.

Type species, *Chrysomyxa Abietis* Unger (on *Pinus Abietis*).

Host belonging to family Pinaceae. 1. *C. Weirii.*
Host belonging to family Ericaceae. 2. *C. Arctostaphyli.*

1. **Chrysomyxa Weirii** H. S. Jackson, Phytopathology **7**: 353. 1917.

O. Pycnia unknown, probably not formed.

III. Telia foliicolous, on yellowish spots, prominent, solitary or in rows, sometimes confluent, with little or no discoloration of leaf, elongate-elliptic, 0.5–1.5 mm. long, dehiscent by longitudinal slit, waxy, dull-orange or orange-brown, ruptured epidermis conspicuous; teliospores readily falling apart, oblong or fusiform-oblong, 5–7 by 16–28 μ, truncate or obliquely attenuate at both ends; wall colorless, thin, 1 μ or less, smooth.

ON PINACEAE:
Picea Engelmanni (Parry) Engelm., Idaho, Montana, Oregon; British Columbia.
TYPE LOCALITY: Whitman National Forest, Oregon, on *Picea Engelmanni.*
DISTRIBUTION: Western Montana to northern Oregon and northward.
ILLUSTRATION: Mycologia **15**: *pl. 17.*
EXSICCATI: Barth. N. Am. Ured. *1706, 2006.*

2. **Chrysomyxa Arctostaphyli** Dietel, Bot. Gaz. **19**: 303. 1894.

Melampsoropsis Arctostaphyli Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded in orbicular groups on reddish-brown spots, soon naked, flat, roundish or polygonal, large, 0.3–0.8 mm. across, waxy, ruptured epidermis conspicuous; teliospores oblong, 13–17 by 23–50 μ, rounded at both ends, in a series 100–170 μ long; wall colorless, thin, 1–1.5 μ, smooth; basidiospores globoid, 6–8 μ in diameter, the contents golden-yellow when fresh.

ON ERICACEAE:
Arctostaphylos Uva-Ursi (L.) Spreng., Alaska, Colorado, Montana, Utah, Wisconsin; Yukon.
TYPE LOCALITY: [Three Lake,] Wisconsin, on *Arctostaphylos Uva-Ursi*.
DISTRIBUTION: Northern Wisconsin to central Utah, and northwestward to southern Yukon.

121. In the key.

Replace the third line by:

Telial host belonging to the family Grossulariaceae.
Species introduced; aecia on Strobus. 3. *C. ribicola.*
Species native; aecia on Caryopitys. 3*a*. *C. occidentale.*

For "5. *C. coleosporioides*" read "5. *C. Harknessii.*"

121. **Cronartium Comptoniae.**

Insert the synonym: *Peridermium Comptoniae* Orton & Adams, Phytopathology **4**: 24. 1914.

Replace the first line of the description by:

O. Pycnia caulicolous, small, blister-like, scattered or sometimes confluent; pycniospores colorless, ovoid or ellipsoid, 1.5–4 by 1.5–6 μ.

I. Aecia caulicolous, when on small branches 0.5–2 cm. in diameter, on trunks of small trees 2.5–5 cm. in diameter, producing only slight fusiform enlargements, individual sori rounded or irregular, 1–1.5 by 1–2 mm. across, occasionally larger if confluent, hemispheric, 1–2 mm. high, rupturing irregularly along sides; aeciospores ellipsoid or obovate, 16–24 by 24–33 μ; wall 2.5–4 μ thick, rather coarsely verrucose with irregular and somewhat deciduous tubercles, with a smooth area at base often extending up one side.

ON PINACEAE:
Pinus contorta Dougl. (*P. Murrayana* Balf.), California, Michigan.
Pinus ponderosa Dougl., California, Massachusetts, Pennsylvania, Wisconsin.
Pinus rigida Mill., Connecticut, New Jersey, New York.
Pinus sylvestris L., Connecticut, Missouri, New York.
Pinus virginiana Mill. (*P. inops* Sol.), New Jersey, Pennsylvania.

Insert: ILLUSTRATIONS: Bull. Penn. Exp. Sta. 160: 8. *f. 1*; 41. *f. 2, 3, pl. 3;* Phytopathology **4**: *pl. 3, f. 1, 2;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 28, 32, f. 1*[2]; Bot. Gaz. **71**: 135. *f. 1*; 136. *f. 3.*

Add the exsiccati: Barth. N. Am. Ured. *2207;* Ellis, N. Am. Fungi *1021;* Thaxter, Rel. Farl. *217;* Vesterg. Micr. Rar. Sel. *1651.*

122. **Cronartium Quercus.**

Add the synonyms: *Crinula paradoxa* Berk. & Curt.; Rav. Fung. Car. **3**: *35*, hyponym. 1855. *Peridermium Harknessii* Blasdale, Asa Gray Bull. **1893**[3]: 2. 1893. Not *P. Harknessii* Moore, 1876. *Caeoma conigenum* Pat. Jour. de Bot. **10**: 386. 1896. *Peridermium fusiforme* Arth. & Kern, Bull. Torrey Club **33**: 421. 1906. *Peridermium mexicanum* Arth. & Kern, Bull. Torrey Club **33**: 422. 1906. *Peridermium globosum* Arth. & Kern, Bull. Torrey Club **33**: 424. 1906. *Caeoma strobilinum* Arth. Bull. Torrey Club **33**: 519. 1906. *Cronartium Cerebrum* Hedgc. & Long, Jour. Agr. Res. **2**: 247. 1914. *Cronartium fusiforme* Hedgc. & Hunt, Phytopathology **8**: 316. 1918. *Cronartium strobilinum* Hedgc. & Hahn, Phytopathology **12**: 109. 1922. *Cronartium conigenum* Hedgc. & Hunt, Phytopathology **12**: 116. 1922.

Replace the first line of the description by:

O. Pycnia caulicolous or conigenous, indefinite, spread over the surface of swellings on which aecia usually appear later, 40–50 μ high; pycniospores globose, 1.5–2 μ in diameter.

Insert, in the first line of the aecial description, after the word " across ": " or conigenous, usually uniting and consolidating the scales of the cone."

Add the hosts, under Pinaceae:

Pinus attenuata Lemmon (*P. tuberculata* Gordon, not D. Don), California.
Pinus caribaea Morelet (*P. Elliottii* Engelm., *P. heterophylla* Sudw.), Florida, Mississippi.
Pinus chihuahuana Engelm., Arizona; Mexico.
Pinus oöcarpa Schiede, Jalisco.
Pinus palustris Mill. (*P. australis* Michx.), Florida, Texas.
Pinus patula Schiede & Deppe, Hidalgo.
Pinus radiata D. Don (*P. insignis* Dougl., *P. tuberculata* D. Don), California.
Pinus scopulorum (Engelm.) Lemmon (*P. ponderosa scopulorum* Engelm.), Nebraska.
Pinus sylvestris L., Ontario.

Insert, after the telial description, the paragraph:

The species as here understood is composed of several well marked forms in the aecial stage, often treated as species, and falling into two groups, the short-lived cone-forms and the perennial trunk-forms, which may eventually be shown to be distinct species, or to constitute races, or possibly to result from reactions of the host.

Add the hosts, under Fagaceae:

Pasania densiflora Oerst., California.
Quercus coccinea Wang., Delaware, Minnesota, New Jersey, Virginia.
Quercus discolor Trel., Mexico.
Quercus dumosa Nutt., California.
Quercus Emoryii Torr., Arizona.
Quercus geminata Small, Florida.
Quercus grisea Liebm., Arizona.
Quercus hypoleuca Engelm., Arizona.
Quercus ilicifolia Wang., New Jersey.
Quercus imbricaria × *marylandica* Sarg. (*Q. nigra tridentata* A. DC., *Q. tridentata* Engelm.), Alabama.
Quercus Kelloggii Newb., California.
Quercus reticulata Humb. & Bonpl., Arizona.
Quercus Wislizeni A. DC., California.

Insert: ILLUSTRATIONS: Bull. Penn. Exp. Sta. 160: *f. 4, 5;* Phytopathology **4**: 7, *f. 1, pl. 2, f. 1;* **6**: 228. *f. 2;* **10**: 283. *f. 1;* Tubeuf & Smith, Dis. Pl. *f. 249, 250;* Bot. Gaz. **71**: 135. *f. 2;* 136. *f. 4;* Jour. Agr. Res. **2**: *pl. 11.*

Add the exsiccati: Barth. Fungi Columb. *2514, 2619, 2718, 2719, 2720, 2925, 3016, 3219, 3220, 3313, 3314;* Barth. N. Am. Ured. *210, 309, 407, 505, 714, 2719.*

122. **Cronartium ribicola.**

Omit " de Waldh." from the citation following the name *Cronartium ribicola.*

Add the synonyms: *Cronartium ribicola* Dietr. Archiv Nat. Liv.-Esth.-Kurl. II. **1**: 287, hyponym. 1856. *Peridermium Klebahni* Rostr. Tidsskr. Skovb. **12**: 188. 1888.

Replace, in the line beginning *Strobus Strobus,* the words " Europe, not yet found in America," with the following: Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Wisconsin.

Add the host: *Strobus monticola* (Dougl.) Rydb. (*Pinus monticola* Dougl.), British Columbia.

Change, in the description of the urediniospores, the thickness of the wall to " 1.5–2 μ."

Omit, under Grossulariaceae, " *Ribes longiflorum* Nutt., Kansas," and add:

Grossularia Cynosbati (L.) Mill. (*Ribes Cynosbati* L., *R. gracile* Michx.), Ontario.
Grossularia divaricata (Dougl.) Cov. & Britt. (*Ribes divaricatum* Dougl.), Washington; British Columbia.
Grossularia missouriensis (Nutt.) Cov. & Britt. (*Ribes gracile* Britt. & Brown, not Pursh), Minnesota.
Grossularia oxyacanthoides (L.) Mill. (*Ribes oxyacanthoides* L.), Minnesota.
Grossularia reclinata (L.) Mill. (*Ribes Uva-crispa* L., *R. Grossularia* L.), Vermont.
Grossularia rotundifolia (Michx.) Cov. & Britt. (*Ribes rotundifolium* Michx., *R. gracile* Pursh), New York.

Grossularia setosa (Lindl.) Cov. & Britt. (*Ribes setosum* Lindl.), Wisconsin.
Ribes americanum Mill. (*R. floridum* L'Hér.), Maine.
Ribes bracteosum Dougl., Washington; British Columbia.
Ribes glandulosum Weber (*R. prostratum* L'Hér.), Connecticut, Maine.
Ribes lacustre (Pers.) Poir. (*Limnobotrya lacustris* Rydb., *L. echinata* Rydb.), British Columbia.
Ribes nigrum L., New York, Massachusetts, Rhode Island, Washington; British Columbia.
Ribes odoratum Wendl. (*R. longiflorum* Nutt., *Chrysobotrya odorata* Rydb.) (cult.), Massachusetts, New Hampshire, New York, Vermont.
Ribes triste Pall. (*R. rubrum* A. Gray, not L.), New Hampshire.

Change the distribution to read: Locally from Maine and New Jersey to Minnesota and in western Washington and British Columbia, but often exterminated upon discovery; also in Europe and Asia.

Add: ILLUSTRATIONS: Jour. Agr. Res. **14**: *pl. 55;* Bull. Penn. Exp. Sta. 160: 15. *f. 6;* Tech. Bull. N. Y. Exp. Sta. **2**: *pl. 2, 3;* Bull. U. S. Dep. Agr. 957: *pl. 2–6;* Bull. Conn. Exp. Sta. 237: *pl. 23;* Bull. U. S. Dep. Agr. Pl. Ind. 206: *f. 3–5, pl. 1, 2;* U. S. Dep. Agr. Farm. Bull. 742: *f. 1–5, pl. 1.* EXSICCATI: Barth. Fungi Columb. *2318;* Barth. N. Am. Ured. *803, 2910, 3016, 3017;* Thaxter, Rel. Farl. *218.*

123. Insert:

3a. **Cronartium occidentale** Hedgc. Bethel & Hunt, Jour. Agr. Res. **14**: 413. 1918.

Peridermium occidentale Hedgc. Bethel & Hunt, Jour. Agr. Res. **14**: 415. 1918.

O. Pycnia caulicolous, scattered, forming blisters 0.5 cm. or more in diameter; pycniospores obovoid or ellipsoid, 2–3 by 3–5 μ.

I. Aecia caulicolous, causing slight or no hypertrophy, often entirely hidden by the bark; peridium only slightly protruding, thin, delicate, evanescent; peridial cells variable, 12–26 by 17–36 μ, smooth or nearly so on outer surface, verrucose on inner surface, the walls 1–5 μ thick; aeciospores obovoid or ellipsoid, 12–28 by 22–38 μ; wall colorless, 1–5 μ thick, coarsely verrucose with deciduous tubercles, 1.5–4 μ long.

ON PINACEAE:
Caryopitys edulis (Engelm.) Small (*Pinus edulis* Engelm.), Colorado.
Caryopitys monophylla (Torr. & Frem.) Rydb. (*Pinus monophylla* Torr. & Frem.), Arizona, California, Nevada.

II. Uredinia hypophyllous, scattered on irregularly rounded areas, pustular, 0.2–2 mm. in diameter, dehiscent by a central opening, light-yellow or yellow; peridium delicate, colorless; peridial cells at sides elongate, isodiametric above, 12–15 μ in diameter, the walls thin; urediniospores ellipsoid or obovoid, 13–18 by 18–32 μ; wall colorless, 2–3 μ thick, sparsely and sharply echinulate.

III. Telial columns hypophyllous, cylindric, 60–170 μ thick, up to 4 mm. long, walnut-brown; teliospores oblong or cylindric, 9–10 by 27–56 μ, rounded or obtuse at both ends; wall nearly colorless, smooth, 0.5–2 μ thick.

ON GROSSULARIACEAE:
Grossularia divaricata (Dougl.) Cov. & Britt. (*Ribes divaricatum* Dougl.), California.
Grossularia inermis (Rydb.) Cov. & Britt. (*Ribes inermis* Rydb.), Wyoming.
Grossularia leptantha (A. Gray) Cov. & Britt. (*Ribes leptanthum* A. Gray), Colorado, Utah.
Grossularia velutina (Greene) Cov. & Britt. (*Ribes velutinum* Greene, *R. leptanthum brachyanthum* A. Gray), California, Nevada.
Ribes aureum Pursh (*Chrysobotrya aurea* Rydb.), Arizona, California, Colorado, Idaho, Utah, Washington.
Ribes gracillimum Cov. & Britt., California.
Ribes inebrians Lindl. (*R. pumilum* Nutt.), Colorado, Utah.
Ribes odoratum Wendl. (*R. longiflorum* Nutt., *Chrysobotrya odorata* Rydb.), Colorado, Kansas.
TYPE LOCALITY: Bayfield, Colorado, on *Pinus edulis.*
DISTRIBUTION: Northwestern Kansas to central Nevada and northwestward.
ILLUSTRATIONS: Jour. Agr. Res. **14**: *pl. 54, 56, 57.*
EXSICCATI: Barth. N. Am. Ured. *1609, 3012, 3013, 3014, 3015.*

123. **Cronartium Comandrae.**

Reduce this name to synonymy, and substitute: **Cronartium pyriforme** (Peck) Hedgc. & Long, Altern. Stage Perid. Pyrif. 3. 1914.

Add the synonyms: *Peridermium pyriforme* Peck, Bull. Torrey Club **6**: 13. 1875. *Aecidium pyriforme* Farl. Bibl. Index **1**: 78. 1905. *Peridermium Betheli* Hedgc. & Long, Phytopathology **3**: 251. 1913.

Replace the line below the synonymy by:

O. Pycnia caulicolous, scattered over considerable areas, forming minute blister-like swellings; pycniospores pale-greenish, pyriform, 3–4 by 3–7 μ.

I. Aecia caulicolous, on branches or trunks, causing no or only slight fusiform swellings, scattered and usually distinct, oval or irregular, sometimes elongate, 1–3 by 1–6 mm. or larger if confluent; peridium not much exserted, delicate, evanescent by lateral rupture; peridial cells ellipsoid, oblong, or somewhat pyriform in face view, 16–20 by 40–60 μ, the walls 2–4 μ thick; aeciospores pyriform, oblong-pyriform, or obovate, 19–24 by 32–66 μ, usually acuminate above; wall colorless, moderately thick, 2–3 μ, rather finely and closely verrucose with low papillae.

On Pinaceae:
Pinus Banksiana Lamb. (*P. divaricata* Sudw.), Michigan, Wisconsin; Alberta.
Pinus contorta Dougl. (*P. Murrayana* Balf.), Colorado, Idaho, Wyoming; Alberta.
Pinus ponderosa Dougl., California, Colorado, Montana, Oregon, Utah, Washington; British Columbia.
Pinus pungens Lamb., Pennsylvania.
Pinus scopulorum (Engelm.) Lemmon (*P. ponderosa scopulorum* Engelm.), Colorado, South Dakota, Utah.
Pinus sp., New Jersey.

Add the host, under Santalaceae: *Comandra livida* Richards., Wisconsin; Quebec.

Correct the type locality to read: Newfield, New Jersey, on *Pinus* sp.

Insert: Illustrations: Bull. Penn. Exp. Sta. 160: 9. *f. 2;* 11. *f. 3;* 39. *f. 1;* 75. *pl. 6;* Phytopathology **4**: *pl. 3, f. 3, 4;* **7**: 137. *f. 1.*

Add the exsiccati: Barth. Fungi Columb. *3419, 3705, 4815;* Barth. N. Am. Ured. *6, 504, 1111, 1710, 1711, 1911, 2013, 2014, 2114, 2115, 2717, 2718, 3011, 3119;* Brenckle, Fungi Dak. *78, 403;* Clements, Crypt. Form. Colo. *542;* Ellis & Ev. N. Am. Fungi *2419*, not "*4119*" as given; Rab.-Paz. Fungi Eur. *4310;* Thaxter, Rel. Farl. *216;* Sydow, Ured. *2443.*

123. **Cronartium coleosporioides.**

Reduce this name to synonymy, and substitute: **Cronartium Harknessii** (J. P. Moore) Meinecke, Phytopathology **10**: 282. 1920.

Add the synonyms: *Peridermium Harknessii* J. P. Moore, Mo. Micr. Jour. **16**: 164. 1876. *Peridermium filamentosum* Peck, Bot. Gaz. **7**: 56. 1882. *Aecidium Harknessii* Dietel, in E. & P. Nat. Pfl. **1**^{1**}: 79. 1897. *Aecidium filamentosum* Farl. Bibl. Index **1**: 44. 1905. *Peridermium stalactiforme* Arth. & Kern, Bull. Torrey Club **33**: 419. 1906. *Cronartium filamentosum* Hedgc. Phytopathology **2**: 177. 1912. *Cronartium stalactiforme* Arth. & Kern, Bull. Torrey Club **49**: 191. 1922.

Replace the line below the synonymy by:

O. Pycnia caulicolous, scattered irregularly over large areas, forming minute blister-like swellings; pycniospores colorless, globoid, sometimes ellipsoid, 1.5–3 by 1.5–3.5 μ.

I. Aecia caulicolous, scattered over considerable areas, forming no, or large annular, or globoid swellings dependent upon the species of host, cylindric, 1–2 mm. in diameter, 4–7 mm. high, or low and bladdery; peridium rather firm, rupturing along the sides, with filament-like processes extending longitudinally through the spore-mass in cylindric forms, or in flattened forms extending from above and below part way into the spore-mass; peridial cells oblong or ellipsoid, often elongate and pointed at one or both ends, the walls thick, 4–6 μ or more, the inner wall coarsely verrucose, the outer wall finely verrucose; aeciospores oblong, obovate-oblong, or ellipsoid, 14–24 by 23–35 μ; wall colorless, 2.5–4 μ thick, closely and rather coarsely verrucose, some spores showing a smooth area on one side toward the base.

On Pinaceae:
Pinus attenuata Lemmon (*P. tuberculata* Gordon, not D. Don), California.
Pinus chihuahuana Engelm., Arizona.

Pinus contorta Dougl. (*P. Murrayana* Balf.), Alaska, California, Colorado, Idaho, Montana, Oregon, Washington; British Columbia.
Pinus Coulteri Lamb., California.
Pinus Jeffreyi A. Murr. (*P. contorta Jeffreyi* Vasey), California, Nevada.
Pinus ponderosa Dougl., Arizona, California, Colorado, New Mexico, Oregon, Washington; British Columbia.
Pinus sabiniana Dougl., California.
Pinus scopulorum (Engelm.) Lemmon (*P. ponderosa scopulorum* Engelm.), Colorado, Utah.

Insert, after the telial description, the paragraph:

The species as here understood is composed of three distinguishable forms, well marked in the aecial stage, and sometimes treated as species under the names *Cronartium filamentosum* (*Peridermium filamentosum*), *C. stalactiforme* (*P. staloctiforme*) and *C. coleosporioides* (*P. Harknessii*). These forms may eventually be shown to be distinct species, or to constitute races, or possibly to result from the varied reactions of the host.

Add the hosts, under Scrophulariaceae:

Adenostegia rigida Benth. (*Cordylanthus rigidus* Jepson), California.
Adenostegia tenuis (A. Gray) Greene (*Cordylanthus tenuis* A. Gray), California.
Castilleja Christa-galli Rydb., Colorado.
Castilleja confusa Greene, Colorado, New Mexico.
Castilleja crispula Piper, Oregon.
Castilleja Douglasii Benth. (*C. parviflora Douglasii* Jepson), California.
Castilleja integra A. Gray, New Mexico.
Castilleja latifolia Hook. & Arn., California.
Castilleja linariaefolia Benth., Colorado, New Mexico, Utah.
Castilleja pallida (L.) Kunth, Colorado.
Castilleja sulphurea Rydb., Colorado, New Mexico.
Castilleja tenuiflora Benth., Guatemala; Costa Rica.
Elephantella groenlandica (Retz.) Rydb. (*Pedicularis groenlandica* Retz.), Idaho, Washington.
Lamourouxia cordifolia Schl. & Cham., Guatemala.
Lamourouxia dependens Benth., Guatemala.
Lamourouxia rhinanthiifolia H.B.K., Guatemala.
Orthocarpus luteus Nutt., Colorado.
Pedicularis Grayi A. Nelson (*P. procera* A. Gray), New Mexico.
Pedicularis semibarbata A. Gray, California.

Change the type locality to read: Colfax, California, on *Pinus ponderosa*.

Add: ILLUSTRATIONS: Phytopathology **7**: 138. *f. 2;* **10**: 283. *f. 2;* Meinecke, Forest Tree Diseases *pl. 1.* EXSICCATI: Barth. Fungi Columb. *2243, 2717, 4717;* Barth. N. Am. Ured. *1110;* Garrett, Fungi Utah. *202.*

123. Insert:

12a. CROSSOPSORA Sydow, Ann. Myc. **16**: 343. 1918.

Cycle of development imperfectly known, only uredinia and telia recognized, both subepidermal.

Uredinia erumpent, dehiscent by a central pore. Paraphyses when present peripheral, either free and incurved or imbricated by the union of their bases and the free part extending into the sorus, thus forming a pseudoperidium. Urediniospores borne singly on pedicels, ellipsoid or obovoid; wall colored or nearly colorless, sparsely echinulate, the pores obscure.

Telia erumpent, the catenulate spores adhering to form a filiform column, somewhat horny when dry. Teliospores oblong or fusiform, one-celled; wall colored, thin, smooth.

Type species, *Cronartium Zizyphi* Syd. & Butl. (on *Zizyphus Oenoplia*).

Host belonging to family Malpighiaceae. 1. *C. notata.*
Host belonging to family Vitaceae. 2. *C. Wilsoniana.*

1. **Crossopsora notata** Arthur.

Uredo notata Arth. Mycologia **9**: 89. 1917.
Cronartium notatum Arth. Mem. Torrey Club **17**: 114. 1918.

II. Uredinia hypophyllous, scattered or somewhat grouped, bullate, 0.1–0.4 mm. across, fuscous; paraphyses imbricated into a pseudoperidium, the free portion of each cylindric, obtuse or acuminate, 9–15 μ in diameter, 75–115 μ long, the wall colorless, very thick, almost obliterating the lumen; urediniospores ellipsoid or broadly obo-

void, 23–30 by 35–50 μ; wall golden-brown, moderately thick, 2–4 μ, sometimes thicker above, 3–7 μ, strongly and sparsely echinulate.

III. Telial columns hypophyllous, somewhat grouped, cylindric, moderately stout and short, 90–145 μ in diameter, 1–1.5 mm. long, chestnut-brown; teliospores oblong, 17–26 by 45–64 μ, obtuse or truncate at both ends; wall yellow, 2–3 μ thick, smooth.

ON MALPIGHIACEAE:
Byrsonima crassifolia (L.) H.B.K., Cuba; Porto Rico.
TYPE LOCALITY: Mayagüez, Porto Rico, on *Byrsonima crassifolia*.
DISTRIBUTION: West Indies.

2. **Crossopsora Wilsoniana** Arthur.

Cronartium Wilsonianum Arth. Mem. Torrey Club **17**: 114. 1918.

II. Uredinia chiefly hypophyllous, scattered or sometimes in small groups, round, small, 0.2 mm. or less in diameter, soon widely open, pulverulent, very pale straw-colored; paraphyses free, incurved, clavate, 13–15 by 35–40 μ, the wall pale-yellow or colorless, thin, about 1 μ, smooth; urediniospores broadly ellipsoid or obovoid, 18–21 by 24–27 μ; wall pale-yellow or colorless, thin, 1.5 μ or less, sparsely, very sharply and prominently echinulate.

III. Telial columns hypophyllous, scattered, cylindric, slender and long, about 70 μ in diameter, 2–3 mm. long, dark chestnut-brown; teliospores terete or fusiform, 10–13 by 48–61 μ, usually obtuse at both ends; wall pale cinnamon-brown, thin, about 1 μ, smooth.

ON VITACEAE:
Cissus rhombifolia Vahl, Honduras; Costa Rica; Cuba.
TYPE LOCALITY: San Juan, Isle of Pines, Cuba, on *Cissus rhombifolia*.
DISTRIBUTION: West Indies and Central America; also in South America.

123. CEROTELIUM.

Change the first paragraph of the generic description to read: Cycle of development includes pycnia, aecia, uredinia, and telia, with distinct alternating phases; heteroecious. Pycnia subcuticular, other sori subepidermal.

Pycnia flat, effused, without ostiolar filaments.

Aecia erumpent, definite, cupulate. Peridium firm, colorless, dehiscent at apex, the margins more or less recurved. Aeciospores catenulate, globoid or ellipsoid, wall colorless, verrucose.

Replace statement about peridium and peridial cells with: "Delicate peridia, hyphoid paraphyses, or neither."

124. Insert, after line 4:

Telial host belonging to family Artocarpaceae.	1. *C. Fici.*
Telial host belonging to family Urticaceae.	2. *C. Dicentrae.*
Telial host belonging to family Fabaceae.	3. *C. Canavaliae.*
Telial host belonging to family Anacardiaceae.	4. *C. alienum.*
Telial host belonging to family Malvaceae.	5. *C. desmium.*

1. **Cerotelium Fici** (Cast.) Arth. Bull. Torrey Club **44**: 509. 1917.

Uredo Fici Cast.; Desmaz. Pl. Crypt. (Fasc. 34) *1662*. 1848.
Uredo Citri Cooke, Grevillea **6**: 138. 1878.
Uredo Fici guarapiensis Speg. Anal. Soc. Ci. Argent. **17**: 120. 1884.
Uredo ficicola Speg. Anal. Soc. Ci. Argent. **17**: 120. 1884.
Uredo citrina De-Toni, in Sacc. Syll. Fung. **7**: 845. 1888.
Caeoma Mori Barclay, Jour. As. Soc. Bengal **59**[2]: 97. 1890.
Aecidium Mori Barclay, Jour. As. Soc. Bengal **60**[2]: 225. 1891.
Uredo Fici abyssinica P. Henn. Bot. Jahrb. **17**: 15. 1893.
Uredo ficina Juel, Bih. Sv. Vet.-Akad. Handl. **23** (3)[10]: 25. 1897.
Uredo Trabutii Pat. Bull. Soc. Myc. Fr. **17**: 187. 1901.
Uredo moricola P. Henn. Hedwigia **41**: 140. 1902.
Physopella Fici Arth. Résult. Sci. Congr. Bot. Vienne 338. 1906.
Physopella ficina Arth. N. Am. Flora **7**: 103. 1907.
Kuehneola Fici Butler, Ann. Myc. **12**: 76. 1914.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered thickly over large areas, roundish, usually small, 0.1–0.3 mm. across, bullate, tardily dehiscent by central rupture, pulverulent, cinnamon-brown, ruptured epidermis overarching or erect; paraphyses variable, sometimes absent, colorless, cylindric, hyphoid and erect, or pale-brown, firm and incurved, 40–80 μ long, the wall thin, or thickened to 7 μ on convex side; urediniospores broadly ellipsoid or obovate-globoid, 14–23 by 18–32 μ; wall pale-yellowish or pale-fuscous, thin, 1–1.5 μ, sparsely echinulate.

III. Telia hypophyllous, scattered or somewhat grouped, minute, tardily naked, slightly pulverulent, whitish; teliospores catenulate, 2–7 in a chain, broadly ellipsoid or oblong, 10–13 by 15–22 μ; wall colorless, thin, 1–1.5 μ, smooth.

ON ARTOCARPACEAE:
Chlorophora tinctoria (L.) Gaud., Cuba.
Ficus aurea Nutt., Florida; Guatemala.
Ficus Carica L., Alabama, Florida, Louisiana, Mississippi, North Carolina, South Carolina, Texas; Costa Rica; Bermuda; Cuba; Porto Rico.
Ficus Combsii Warb., Cuba.
Ficus crassinervia Desp., Porto Rico.
Ficus elastica Roxb., Cuba.
Ficus laevigata Vahl, Mona Island; Porto Rico.
Ficus lentiginosa Vahl, Porto Rico.
Ficus padifolia H.B.K., Guatemala.
Ficus religiosa L., Cuba.
Toxylon pomiferum Raf. (*Maclura aurantiaca* Nutt.), Louisiana, South Carolina.

TYPE LOCALITY: France, on *Ficus* sp.

DISTRIBUTION: North Carolina to Texas and southward through the West Indies and Central America; also in tropical regions throughout the world.

ILLUSTRATIONS: Briosi & Cavara, Funghi Paras. 358; E. & P. Nat. Pfl. 1[1]**: *f. 55A;* Ann. Myc. **12**: 78. *f. 2;* Bih. Sv. Vet.-Akad. Handl. **23** (3)[10]: *pl. 4, f. 36, 37;* Sydow, Monog. Ured. **3**: *pl. 17, f. 154;* Jour. As. Soc. Bengal **59**[2]: *pl. 6, f. 6;* Sawada, Descr. Cat. Formosan Fungi II. *pl. 5, f. 10, 11.*

EXSICCATI: Barth. Fungi Columb. *2650, 3161;* Barth. N. Am. Ured. *920, 1126, 3123;* Ellis, N. Am. Fungi *1080;* Seym. & Earle, Econ. Fungi *150, 211.*

2. **Cerotelium Dicentrae** (Trel.) Mains & And.; Mains, Am. Jour. Bot. **8**: 445. 1921.

Aecidium Dicentrae Trel. Trans. Wis. Acad. **6**: 136. 1884.
Cerotelium Urticastri Mains, Am. Jour. Bot. **8**: vi, 451, hyponym. 1921.

O. Pycnia amphigenous, usually bordering the margin of the leaf, conspicuous, pale-fuscous, becoming dark chestnut- or chocolate-brown, applanate, 160–200 μ across, by 40–60 μ high; ostiolar filaments wanting.

I. Aecia hypophyllous, sparsely scattered over the entire leaf, cupulate, 0.1–0.5 mm. in diameter; peridium white, the margin remaining somewhat incurved, erose; peridial cells rhomboidal in side view, 15–20 by 24–35 μ, considerably overlapping, the outer wall 7–9 μ thick, faintly transversely striate, smooth, the inner wall 3–5 μ thick, closely and finely verrucose; aeciospores somewhat angularly globoid or ellipsoid, 12–17 by 13–21 μ; wall colorless, thin, 1 μ or less, closely and very finely verrucose.

ON FUMARIACEAE:
Bicuculla Cucullaria (L.) Millsp. (*Dicentra Cucullaria* Torr.), Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, New Jersey, New York, Pennsylvania, South Dakota, Wisconsin.

II. Uredinia hypophyllous, scattered or in small groups 1–2 mm. across, not conspicuous, round, small, 0.1–0.2 mm. in diameter, tardily naked, pulverulent, yellow, ruptured epidermis evident; paraphyses peripheral, colorless, hyphoid, 7–10 by 26–48 μ, not projecting above the ruptured epidermis, somewhat incurved; urediniospores ellipsoid or obovoid, 18–21 by 20–26 μ; wall colorless, 1–1.5 μ thick, closely echinulate.

III. Telia hypophyllous, somewhat gregarious, at first arising within or surrounding the uredinia, angular, 0.2–0.5 mm. across, low-hemispheric, inconspicuous, tardily naked, waxy, slightly tinted, becoming flocculose and white when in germination; teliospores catenulate, 2–3 in a chain, usually only one at margin of sorus, cylindric or ellipsoid, 10–21 by 29–42 μ; wall colorless, very thin, uniformly 0.5 μ or less; basidiospores globoid, 10–13 μ in diameter.

ON URTICACEAE:
Urticastrum divaricatum (L.) Kuntze (*Laportea canadensis* Gaud.), Illinois, Wisconsin.
TYPE LOCALITY: Madison, Wisconsin, on *Dicentra Cucullaria.*
DISTRIBUTION: New Jersey to Kansas and northward.
ILLUSTRATIONS: Am. Jour. Bot. **8**: 447. *f. 4, 5;* 448. *f. 6.*
EXSICCATI: Barth. N. Am. Ured. *203, 2612, 2613;* Ellis & Ev. Fungi Columb. *1903;* Kellerm. & Swingle, Kansas Fungi *2;* Rab.-Paz. Fungi Eur. *4335;* Sydow, Ured. *497.*

124. **Cerotelium Canavaliae.**

Change the number of the species from " 1 " to " 3."

Insert the synonyms: *Uredo Canavaliae* P. Henn. in DeWild. Ét. Fl. Bas-Congo **2**: 224. 1908. *Dietelia Canavaliae* Sydow, Monog. Ured. **3**: 525. 1915.

Insert:

O and I. Pycnia and aecia unknown.

Add the host: *Canavalia gladiata* (Jacq.) DC., Porto Rico.

Change the distribution to read: Porto Rico; also in western Africa.

124. Insert:

4. **Cerotelium alienum** (Sydow & Butler) Arthur.

Chrysomyxa aliena Sydow & Butler, Ann. Myc. **10**: 267. Je 1912.
Uredo Spondiadis Petch, Ann. Bot. Gard. Peradeniya **5**: 248. Au 1912.
Kuehneola aliena Sydow & Butler; Sydow, Monog. Ured. **3**: 322. 1914.
Cerotelium Spondiadis Arth. Bull. Torrey Club **44**: 510. 1917.

O and I. Pycnia and aecia unknown.

II. Uredinia chiefly hypophyllous, solitary or in small groups 1–3 mm. across, round or oblong, usually small, 0.1–0.3 mm. long, at first bullate, dehiscent by central pore, pulverulent, pale golden-brown fading to whitish; paraphyses none; urediniospores obovate, oblong, or ellipsoid, 15–22 by 20–32 μ; wall nearly colorless, thin, 1 μ or less, finely echinulate.

III. Telia hypophyllous, scattered or in small groups, roundish, minute, becoming pulverulent at maturity, dirty white; teliospores catenulate, 4–8 in a chain 35–85 μ long, cuboid or cylindric, 10–15 by 10–18 μ; wall yellowish or brownish, thin, 1 μ or less, smooth.

ON ANACARDIACEAE:
Spondias Mombin L. (*S. lutea* L.), Porto Rico.
TYPE LOCALITY: Chittagong, India, on *Spondias mangifera.*
DISTRIBUTION: Porto Rico; also in southern India.

5. **Cerotelium desmium** (Berk. & Br.) Arthur.

Aecidium desmium Berk. & Br. Jour. Linn. Soc. **14**: 95. 1875.
Uredo Gossypii Lagerh. Jour. Myc. **7**: 48. 1891.
Kuehneola Gossypii Arth. N. Am. Flora **7**: 187. 1912.
Uredo desmium Petch, Ann. Bot. Gard. Peradeniya **5**: 247. 1912.
Cerotelium Gossypii Arth. Bull. Torrey Club **44**: 510. 1917.
Kuehneola desmium Butler, Fungi Dis. Plants 363. 1918.

O and I. Pycnia and aecia unknown.

II and III. For description see ante p. 187.

ON MALVACEAE:
Gossypium barbadense L., Haïti; Porto Rico.
Gossypium brasiliense Macfad., Porto Rico.
Montezuma speciosissima Moc. & Sessé (*Thespezia grandiflora* DC.), Porto Rico.
For remainder of hosts and localities see page 187.
TYPE LOCALITY: Peradeniya, Ceylon, on *Gossypium* sp.
DISTRIBUTION: Southern Florida southward through the West Indies; also in South America, India, Java, New Guinea and the Philippines.
ILLUSTRATIONS: Butler, Fungi Dis. Plants *f. 150;* Sydow, Monog. Ured. **3**: 320.
EXSICCATI: Barth. Fungi Columb. *2489.*

124. **CIONOTHRIX.**

Insert the key:

Telial column long, 3 mm. or less.	1. *C. praelonga.*
Telial column short, 0.5 mm. or less.	2. *C. Cupaniae.*

124. **Cionothrix praelonga.**

Add the hosts:

Eupatorium daleoides Hemsl., Costa Rica.
Eupatorium morifolium Mill., Guatemala.
Eupatorium odoratum L., Guatemala; Costa Rica; Panama.

Add: ILLUSTRATIONS: Mém. Soc. Neuch. Sci. Nat. **5**: 544. *f. 56;* 546. *f. 57.*

124. Insert:

2. **Cionothrix Cupaniae** Arth. Mem. Torrey Club **17**: 115. 1918.

O. Pycnia unknown.

III. Telia hypophyllous, in groups on discolored and somewhat thickened areas 3–5 mm. across, a mammiform swelling forming the base from which each column arises, cylindric, short, 0.3–0.5 mm. long, 19–35 μ thick, rigid, colorless; teliospores fusiform, 7–15 by 40–65 μ; wall colorless, thin, 1 μ or less.

ON SAPINDACEAE:
Cupania americana L., Cuba.
Cupania glabra Sw., Cuba.
TYPE LOCALITY: Paso Estancia, Oriente, Cuba, on *Cupania glabra.*
DISTRIBUTION: Cuba.

124. Insert:

14a. ENDOPHYLLOIDES Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 50. 1917.

Cycle of development includes telia, and possibly pycnia. Telia subepidermal.

Pycnia unknown, probably not formed.

Telia erumpent, round, aecidioid, producing a short column, waxy or horny when dry. Peridium inconspicuous or wanting. Teliospores catenulate, one-celled, globoid or ellipsoid; wall colorless, thin, smooth.

Type species, *Endophylloides portoricensis* Whetzel & Olive (on *Mikania cordifolia*).

1. **Endophylloides portoricensis** Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 51. 1917.

Aecidium expansum Arth. Mycologia **7**: 317. 1915. Not *A. expansum* Dietel, 1899.

O. Pycnia unknown, probably not formed.

III. Telia chiefly hypophyllous, on paler areas 5–10 mm. across, short-cylindric, forming more or less waxy or horny columns, about 0.3 mm. in diameter, 0.5–1 mm. long; peridium fragile, scarcely continuous; peridial cells usually collapsed, 36–42 μ long, the wall colorless, thin, finely verrucose; teliospores globoid or ellipsoid, 12–16 by 15–22 μ; wall colorless, thin, about 0.5 μ, inconspicuously verrucose, appearing smooth when wet.

ON CARDUACEAE:
Mikania cordifolia (L.f.) Willd. (*Willugbaeya cordifolia* Kuntze), Guatemala; Porto Rico.
Mikania fragilis Urban, Porto Rico.
Mikania micrantha H.B.K., Honduras; Salvador.
Mikania odoratissima Urban, Porto Rico.
Mikania scandens (L.) Willd. (*Willugbaeya scandens* Kuntze), Guatemala; Panama.
Mikania Stevensiana Britton, Porto Rico.
TYPE LOCALITY: [Mayagüez], Porto Rico, on *Mikania cordifolia.*
DISTRIBUTION: Central America and the West Indies; also in South America.
ILLUSTRATIONS: Am. Jour. Bot. **4**: *pl. 2, f. 7, 8; pl. 3, f. 9, 10.*

124. **Alveolaria Cordiae.**

Add the hosts:

Cordia corymbosa (L.) G. Don, Panama.
Cordia ferruginea R. & S., Costa Rica.
Cordia riparia H.B.K., Guatemala.

Add: ILLUSTRATIONS: E. & P. Nat. Pfl. 1^{1**}: *f. 27A;* Mém. Soc. Neuch. Sci. Nat. **5**: 548. *f. 58;* Sydow, Monog. Ured. **3**: *pl. 27, f. 179.*

125. **Baeodromus Eupatorii.**

Add the synonym: *Pucciniosira Eupatorii* Lagerh.; Arth. Am. Jour. Bot. **5**: 435. 1918.

Add the host: *Eupatorium Aschenbornianum* Schauer, Guatemala.

125. **Baeodromus Holwayi.**

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 27, f. 178.*

Add: EXSICCATI: Barth. N. Am. Ured. *207.*

125. **Baeodromus californicus.**

Add: EXSICCATI: Barth. N. Am. Ured. *2703.*

126. **ENDOPHYLLUM.**

Replace the key by the following:

Host belonging to family Crassulaceae.	1. *E. Sempervivi.*
Host belonging to family Vitaceae.	2. *E. circumscriptum.*
Host belonging to family Malvaceae.	3. *E. tuberculatum.*
Host belonging to family Verbenaceae.	4. *E. Stachytarphetae.*
Host belonging to family Carduaceae.	5. *E. decoloratum.*

126. **Endophyllum Rivinae** and **Vernoniae.**

Omit these two species and all pertaining to them, which have been placed under *Dicaeoma Rivinae* (page 388) and *Dicaeoma erraticum* (page 420).

126. Insert:

1. **Endophyllum Sempervivi** (Alb. & Schw.) DeBary, Ann. Sci. Nat. IV. **20**: 86. 1863.

Uredo Sempervivi Alb. & Schw. Consp. Fung. 126. 1805.
Uredo ovata Sempervivi Strauss, Ann. Wett. Ges. **2**: 94. 1810.
Endophyllum Persoonii Lév. Mém. Soc. Linn. Paris **4**: 208. 1825.
Caeoma Sempervivi Link, in Willd. Sp. Pl. 6^2: 27. 1825.
Erysibe insculpta Sempervivorum Wallr. Fl. Crypt. Germ. **2**: 202. 1833.

O. Pycnia amphigenous, or only epiphyllous, few, brownish, globoid-conic, 120–170 μ in diameter.

III. Telia amphigenous, irregularly scattered, round, 0.4–0.8 mm. in diameter, soon naked, yellowish, pulverulent, ruptured epidermis somewhat overarching; peridium well developed, somewhat cupulate, evanescent; peridial cells readily falling apart, globoid or ellipsoid, 20–35 by 20–42 μ, the outer wall 4–7 μ thick, nearly or quite smooth, the inner wall 3–5 μ thick, strongly and closely verrucose; teliospores angularly globoid or somewhat ellipsoid, 18–28 by 18–35 μ; wall pale brownish-yellow, thick, 3–4 μ, closely and prominently verrucose.

This European species is correlated with the heteroecious *Dicaeoma longissimum* (Schroet.) Kuntze, whose uredinia and telia are on *Koeleria cristata*, the morphological characters and the hosts corresponding to those of the aecia of that species. The two species have doubtless had a common origin.

ON CRASSULACEAE:
Sempervivum punctatum C. Smith, New Jersey.
TYPE LOCALITY: Von der Lausche, Upper Lusatia [Prussia], on *Sempervivum globiferum.*
DISTRIBUTION: Introduced in one locality near Rutherford, New Jersey; also in Europe.
ILLUSTRATIONS: Ann. Sci. Nat. IV. **20**: *pl. 12, f. 1–4;* Beitr. Krypt. Schweiz 3^2: *f. 297;* Centr. Bakt. II. Abt. **32**: *f. 1–14, pl. 1–2;* **36**: 398. *f. 1–3, pl.*; Mém. Soc. Linn. Paris **4**: *pl. 11, f. 1–3;* Fl. Ital. Crypt. Ured. *f. 89;* Bull. Soc. Myc. Fr. **33**: 71. *f. 1–6;* Bull. Soc. Bot. Fr. **66**: 17. *f. 1A;* 23. *f. 3;* 24. *f. 4.*

2. **Endophyllum circumscriptum** (Schw.) Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 49. 1917.

Aecidium circumscriptum Schw.; Berk. & Curt. Jour. Acad. Phila. II. **2**: 283. 1853.
Aecidium Cissi Wint. Hedwigia **23**: 168. 1884.
Aecidium guttatum Kunze; Sydow, Ann. Myc. **18**: 179. 1920.
Endophyllum guttatum Sydow, Ann. Myc. **18**: 179. 1920.

O. Pycnia epiphyllous, few, scarcely noticeable, punctiform, in section 80–85 μ broad.

III. Telia chiefly hypophyllous, crowded on orbicular spots that are sometimes hypertrophied, soon dehiscent, pulverulent, small, 0.1–0.2 mm. in diameter; peridium cupulate, the margin recurved, lacerate; peridial cells ellipsoid or oblong, 16–18 by 20–26 μ, readily falling apart, the wall thin, 1 μ or less, the outer wall smooth, the inner wall noticeably rugose; teliospores globoid or broadly ellipsoid, small, 12–15 by 14–18 μ; wall colorless, thin, 1 μ or less, finely and closely verrucose.

ON VITACEAE:
Cissus sicyoides L., Guatemala; Salvador; Costa Rica; Panama; Cuba; Jamaica; Santo Domingo; Porto Rico; St. Thomas; St. Kitts.
TYPE LOCALITY: Surinam, on "some unknown plant," now determined as *Cissus sicyoides*.
DISTRIBUTION: Central America and the West Indies; also in South America.
ILLUSTRATIONS: Am. Jour. Bot. **4**: *pl. 1, f. 3, 4;* Mém. Soc. Neuch. Sci. Nat. **5**: 565. *f. 73.*
EXSICCATI: Barth. N. Am. Ured. *1602.*

3. **Endophyllum tuberculatum** (Ellis & Kellerm.) Arth. & Fromme, Bull. Torrey Club **42**: 58. 1915.

Aecidium tuberculatum Ellis & Kellerm. Jour. Myc. **4**: 26. 1888.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, systemic from a perennial mycelium, following the veins or covering large areas, bullate, round or elliptic, large, 0.5–1 mm. broad by 0.5–1.5 mm. long, at first orange-yellow, becoming pale-yellow, soon dehiscent by a central opening, pulverulent; peridium colorless, evanescent; peridial cells oblong, slightly larger than the teliospores, the outer wall transversely striate, 5–7 μ thick, smooth, the inner wall thinner, 1–3 μ, coarsely verrucose; teliospores angularly globoid or oblong, 16–26 by 18–30 μ; wall pale-yellow, moderately thin, 1–2 μ, closely and rather prominently verrucose.

The habit, general structure, and hosts indicate that this species is correlated with the autoecious *Allodus graminella* (Speg.) Arth. and the heteroecious *Allodus interveniens* (Peck) Bethel, although some difference exists in the thickness of the walls of corresponding spores and peridial cells in the three species. They have doubtless been derived from a common origin, together with *Micropuccinia Sherardiana* (Körn.) Arth. & Jackson.

ON MALVACEAE:
Althaea rosea L., Colorado, Nebraska, Oklahoma.
Callirhoë involucrata (T. & G.) A. Gray, Kansas, Nebraska, Oklahoma.
Sidalcea candida A. Gray, Colorado.
Sidalcea neomexicana A. Gray, Colorado, Wyoming.
TYPE LOCALITY: Rooks County, Kansas, on *Callirhoë involucrata*.
DISTRIBUTION: On the plains from Wyoming to Oklahoma.
ILLUSTRATIONS: Bull. Torrey Club **42**: 56, *f. 1, pl. 2.*
EXSICCATI: Barth. Fungi Columb. *4502;* Barth. N. Am. Ured. *302, 601, 1202, 1610, 2116, 2617, 2912;* Carleton, Ured. Am. *31;* Ellis & Ev. Fungi Columb. *500;* Kellerm. & Sw. Kans. Fungi *30;* Rab.-Paz. Fungi Eur. *4239;* Sydow, Ured. *1199.*

4. **Endophyllum Stachytarphetae** (P. Henn.) Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 50. 1917.

Aecidium Stachytarphetae P. Henn. Hedwigia Beibl. **38**: 71. 1899.

O. Pycnia not seen, probably not formed.

III. Telia hypophyllous, 1–6 or more on slightly hypertrophied areas, round, small, 0.1–0.2 mm. in diameter; peridium colorless, somewhat cupulate or cylindric, evanescent; peridial cells angularly globoid or oblong in face view, 16–18 by 20–27 μ, the wall thin, about 1 μ, the outer wall smooth, the inner wall finely rugosely verrucose; teliospores globoid, 14–15 by 15–25 μ; wall colorless, thin, 1 μ or less, very finely and closely verrucose.

ON VERBENACEAE:
Valerianodes cayennensis (Vahl) Kuntze (*Stachytarpheta cayennensis* Vahl), Santo Domingo; Porto Rico.
Valerianodes jamaicensis (L.) Kuntze (*Stachytarpheta dichotoma* Vahl, *S. jamaicensis* Vahl), Panama.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Stachytarpheta dichotoma*.
DISTRIBUTION: West Indies and Panama; also in South America.
ILLUSTRATIONS: Am. Jour. Bot. **4**: *pl. 1, f. 5, 6.*

5. **Endophyllum decoloratum** (Schw.) Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 49. 1917.

Aecidium decoloratum Schw.; Berk. & Curt. Jour. Acad. Phila. II. **2**: 283. 1853.
Aecidium Wedeliae Earle, Muhlenbergia **1**: 16. 1901.
Aecidium Clibadii Sydow, Ann. Myc. **1**: 333. 1903.
Endophyllum Wedeliae Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 49. 1917.
Aecidium Pumilio Kunze; Sydow, Ann. Myc. **18**: 179. 1920.
Endophyllum Pumilio Sydow, Ann. Myc. **18**: 179. 1920.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, in crowded orbicular groups 2–4 mm. across, on larger discolored areas, soon dehiscent, pulverulent, small, 0.1–0.2 mm. in diameter; peridium colorless, cupulate, the margin erect or recurved, lacerate, evanescent; peridial cells globoid or oblong in face view, rhombic-ellipsoid or obovate in section, 15–22 by 20–32 μ, the outer wall 3–7 μ thick, smooth; the inner wall thinner, 2–6 μ, finely verrucose; teliospores globoid or broadly ellipsoid, 12–18 by 16–20 μ; wall colorless, thin, about 1 μ, closely and inconspicuously verrucose.

ON CARDUACEAE:
Clibadium arboreum J. D. Smith, Oaxaca.
Clibadium Donnell-Smithii Coult., Guatemala.
Clibadium erosum (Sw.) DC., Porto Rico.
Clibadium surinamense L. (*C. asperum* DC., *Baillieria aspera* Aubl.), Panama.
Wedelia trilobata (L.) Hitchc. (*W. carnosa* Rich., *Stemmodontia trilobata* Small), Honduras; Panama; Jamaica; Porto Rico.

TYPE LOCALITY: Surinam, doubtfully on "Urticaceae" or "*Ballieria aspera*," now determined as *Clibadium surinamense*.

DISTRIBUTION: Southern Mexico, Central America, and the West Indies; also in South America.

ILLUSTRATIONS: Am. Jour. Bot. **4**: *pl. 3, f. 11–14;* Mém. Soc. Neuch. Sci. Nat. **5**: 575. *f. 81.*

EXSICCATI: Barth. N. Am. Ured. *1605.*

126. **PUCCINIOSIRA.**

Add the synonym: *Didymosira* Clements, Gen. Fungi 99. 1909.

127. **Pucciniosira pallidula.**

Add the hosts:

Triumfetta Bartramia L., Porto Rico.
Triumfetta speciosa Seem., Salvador.

Add: ILLUSTRATIONS: E. & P. Nat. Pfl. **1**^{1**}: *f. 21A;* Mém. Soc. Neuch. Sci. Nat. **5**: 549. *f. 59;* Sydow, Monog. Ured. **3**: *pl. 24, f. 173.*

127. **Pucciniosira Brickelliae.**

Insert the synonyms: *Aecidium Montanoae* Dietel & Holway; Holway, Bot. Gaz. **24**: 36. 1897. *Aecidium Guadalajarae* Sydow, Oesterr. Bot. Zeits. **52**: 183. 1902.

Add the hosts:

Coleosanthus adenocarpus (B. L. Robinson) Arth. (*Brickellia adenocarpa* B. L. Robinson), Guatemala.
Coleosanthus hebecarpus (A. Gray) Kuntze (*Brickellia hebecarpa* A. Gray), Jalisco.
Coleosanthus tomentellus (A. Gray) Kuntze (*Brickellia tomentella* A. Gray), Mexico (state).
Montanoa sp., Mexico (state).

127. Add:

19. CHRYSOCELIS Lagerh. & Dietel; Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 542. 1913.

Cycle of development includes pycnia, aecia, and telia; autoecious. Pycnia and other sori subepidermal.

Pycnia globoid, immersed.

Aecia bullate, opening by a central pore. Peridium wanting. Aeciospores globoid or ellipsoid; wall colorless, finely verrucose.

Telia soon naked, waxy. Teliospores in a single layer, sessile, terete, one-celled; wall thin, colorless, smooth.

Type species, *Chrysocelis Lupini* Lagerh. & Dietel (on *Lupinus* sp.).

1. **Chrysocelis Lupini** Lagerh. & Dietel; Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 542. 1913.

O. Pycnia amphigenous, pale brownish-yellow, inconspicuous, globoid, in section 100–160 μ in diameter.

I. Aecia hypophyllous, irregularly scattered, or in small groups, bullate, round, 0.5–1 mm. in diameter, dehiscent by a central opening; peridium none, but its place taken by a more or less evident hyphal layer; aeciospores globoid or broadly ellipsoid, 16–23 by 24–36 μ; wall colorless, 2–3 μ thick, closely and very finely verrucose.

III. Telia hypophyllous, crowded in irregular groups 2–10 mm. across on yellowish spots, early naked, minute, but appearing continuous upon early germination, waxy at first, then apparently pulverulent by germination; teliospores cylindric or elongate-clavate, 10–16 by 40–60 μ; wall colorless, very thin, 0.5 μ or less, smooth.

ON FABACEAE:
Lupinus Clarkei Oerst., Costa Rica.
TYPE LOCALITY: Paramo Cruz Verde above Bogotá, Colombia, on *Lupinus* sp.
DISTRIBUTION: Central America; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 543. *f. 55*.

20. BOTRYORHIZA Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 47. 1917.

Cycle of development imperfectly known, only telia seen, which are subepidermal. Telia erumpent, round, very small, without peridium. Teliospores borne singly on long pedicels, ovoid, colorless; wall thin, smooth.

Type species, *Botryorhiza Hippocrateae* Whetzel & Olive (on *Hippocratea volubilis*).

1. **Botryorhiza Hippocrateae** Whetzel & Olive; Olive & Whetzel, Am. Jour. Bot. **4**: 47. 1917.

III. Telia hypophyllous, sometimes caulicolous, on leaves producing round gall-like swellings 2–10 mm. in diameter, on young shoots producing systemic distortion, crowded, round, very small, 0.1–0.3 mm. in diameter, soon naked, slightly pulverulent, yellowish at first, soon white; teliospores globoid or ovate, 13–16 by 16–24 μ, with prominent apical umbo; wall colorless, very thin, 0.5 μ or less, smooth; pedicel colorless, terete, slender, 2.5–3 μ in diameter, 6–10 μ long.

ON HIPPOCRATEACEAE:
Hippocratea volubilis L., Cuba; Porto Rico.
TYPE LOCALITY: [Mayagüez], Porto Rico, on *Hippocratea volubilis*.
DISTRIBUTION: West Indies.
ILLUSTRATIONS: Am. Jour. Bot. **4**: *pl. 1, f. 1, 2;* Brooklyn Bot. Gard. Mem. **1**: *pl. 8*.

AECIDIACEAE

BY JOSEPH CHARLES ARTHUR

129. In the key.

Replace line 13 by:

Teliospores flattened and more or less adhering laterally.	
Life-cycle with (pycnia ?), uredinia and telia.	5. DICHEIRINIA.
Life-cycle with (pycnia ?) and telia.	5*a*. DIABOLE.

Insert after line 19:

Life-cycle with pycnia, aecia and telia.	9*a*. LIPOSPORA.

Replace line 26 by:

Teliospores three-celled.	
Life-cycle with all spore-forms.	11. PHRAGMOPYXIS.
Life-cycle with pycnia and telia.	11*a*. TRICELLA.

Insert after line 29:

Teliospores one-celled.	13*a*. HAPLOPYXIS.

Replace line 45 by:

Life-cycle imperfectly known; teliospores in globoid heads, appendaged.
Teliospores known. 21. NYSSOPSORA.
Teliospores and urediniospores known. 21*a*. SPHAEROPHRAGMIUM.

Replace line 52 by:

Teliospores three- to thirteen-celled.
Teliospores sessile, many-celled, the wall pale or colorless. 25. KUEHNEOLA.
Teliospores stalked, few-celled, the wall colored. 25*a*. FROMMEA.
Life-cycle with pycnia and telia. 25*b*. KUNKELIA.
Pycnia and other sori subepidermal; telia erumpent or the spores discharged through a pore in the overarching tissues, teliospores free, but usually more or less adhering by the mucilaginous surface of the spores, wall pale or colorless, pores one in a cell and apical; aecia unknown; uredinia when present without peridium or paraphyses, spores borne singly on pedicels. Subfamily SKIERKATAE.
Teliospores separating from the pedicel, often discharged in mucilaginous filaments.
Life-cycle with pycnia, uredinia and telia. 25*c*. SKIERKA.
Life-cycle with pycnia and telia. 25*d*. CTENODERMA.
Teliospores adhering to the pedicel.
Life-cycle with (pycnia ?), uredinia and telia. 25*e*. SPHENOSPORA.
Life-cycle with (pycnia ? and) telia. 25*f*. CHACONIA.

Insert after line 56:

Life-cycle with all spore-forms. 25*g*. GYMNOTELIUM.

In line 57, for AECIDIUM read GYMNOSPORANGIUM.

Omit the last line on the page.

130. In the key.

Omit the first three lines.

In line 9, for UROMYCOPSIS read PUCCINIOLA.

In line 15, for TELOSPORA read TELEUTOSPORA.

In line 16, for DASYSPORA read MICROPUCCINIA.

130. Add to the key:

Pycnia and aecia unknown, other sori superficial, forming tufts arising from the stomata; teliospores free, wall firm, pores one in a cell and apical; uredinia without paraphyses or peridium. Subfamily DESMELLATAE. 38. DESMELLA.
Pycnia and telia subepidermal, aecia superficial; uredinia unknown; telia erumpent, teliospores free, wall firm, pores one in a cell, the upper one apical, the lower one near pedicel; aecia hyphoid, forming tufts arising from the stomata, aeciospores colorless, pedicellate, borne singly on the branches of monopodial hyphae. Subfamily DASYSPORATAE. 39. DASYSPORA.

130. **NEORAVENELIA.**

Insert the synonyms: *Longia* Sydow, Ann. Myc. **19**: 165. 1921. *Cephalotelium* Sydow, Ann. Myc. **19**: 165. 1921.

In the description of the aecia, for "without peridium" read "with or without peridium."

Insert the key:

Aecia without peridium; urediniospore-pores 4. 1. *N. Holwayi*.
Aecia with peridium; urediniospore-pores 6. 2. *N. Subtortuosae*.

130. **Neoravenelia Holwayi.**

Add the host: *Prosopis glandulosa* Torr., Texas.

130. Insert:

2. **Neoravenelia Subtortuosae** (Long) Arthur.

Ravenelia Subtortuosae Long, Bot. Gaz. **72**: 40. 1921.
Cephalotelium Subtortuosae Sydow, Ann. Myc. **19**: 165. 1921.

O. Pycnia unknown.

I. Aecia caulicolous, scattered over hypertrophied areas, forming witches' brooms, cylindric, 0.2–0.3 mm. in diameter, 0.8–1.2 mm. high; peridium erect, the margin erose

and gradually weathering away to base; peridial cells irregularly oblong or polygonal in face view, abutted, the outer wall 5–6 μ thick, verrucose, the inner wall 2–3 μ thick, verrucose; aeciospores oval or angularly globoid, 13–18 by 18–23 μ; wall cinnamon-brown, 2–3 μ thick, minutely verrucose.

II. Uredinia amphigenous, punctiform, very small, less than 0.3 mm. across, subepidermal, ruptured epidermis inconspicuous; paraphyses very abundant, peripheral, terete, incurved, 10–13 by 40–50 μ, the wall smooth, chocolate-brown; urediniospores obovate or oval, 15–22 by 22–30 μ; wall chestnut-brown, uniformly 1.5–2 μ thick, verrucose, the pores six, equatorial.

III. Telia amphigenous, oval, 0.5–1 mm. across, early naked, cinnamon-brown, subepidermal, ruptured epidermis inconspicuous; paraphyses none; teliospore-heads light-brown, hemispheric or ovoid, irregular in shape and size, 3–6 cells across, 33–100 μ in diameter, smooth; cysts small, as many as marginal spores, subappressed, cohering at sides to one another but not to stipe; pedicel colorless, short, 32–55 μ long, fragile.

ON MIMOSACEAE:
Acacia tortuosa (L.) Willd. (*A. subtortuosa* Shafer), Texas.
TYPE LOCALITY: Corpus Christi, Texas, on *Acacia subtortuosa*.
DISTRIBUTION: Southern Texas.

131. **CYSTINGOPHORA.**

Insert the synonym: *Cystotelium* Sydow, Ann. Myc. **19**: 165. 1921.

131. **RAVENELIA.**

Add the synonym: *Haploravenelia* Sydow, Ann. Myc. **19**: 165. 1921.

131. Substitute the following revised key to the species of Ravenelia (on this page and the next).

Host belonging to family Mimosaceae.	
Uredinial paraphyses absent; urediniospore-pores equatorial.	
Urediniospore-wall thicker above.	
Urediniospores obovoid or ellipsoid, the apex rounded.	
Urediniospore-pores 3 or 4.	1. *R. Ingae.*
Urediniospore-pores 4.	1*a*. *R. havanensis.*
Urediniospore-pores 4–6.	2. *R. Pithecolobii.*
Urediniospores lance-ovoid, the apex acute.	2*b*. *R. distans.*
Urediniospore-wall evenly thick.	
Urediniospore-pores equatorial.	
Urediniospore-pores 3.	3. *R. Entadae.*
Urediniospore-pores 4.	1*a*. *R. havanensis.*
Urediniospore-pores 6.	2*a*. *R. Siderocarpi.*
Urediniospore-pores scattered.	6*c*. *R. ectypa.*
Uredinial paraphyses present.	
Urediniospore-wall thicker above.	
Urediniospore-pores equatorial.	
Paraphyses cylindric, incurved.	7*a*. *R. australis.*
Paraphyses clavate or capitate, erect.	
Urediniospore-wall 2–3 μ thick.	4. *R. arizonica.*
Urediniospore-wall 1.5 μ thick or less.	
Urediniospore-apex acute.	4*a*. *R. Lysilomae.*
Urediniospore-apex rounded.	
Telial head smooth.	
Telia subepidermal.	6. *R. Leucaenae-microphyllae.*
Telia subcuticular.	6*a*. *R. Cebil.*
Telial head spinose.	4*b*. *R. sololensis.*
Urediniospore-pores extra-equatorial.	
Urediniospore-pores in two bands equidistant from the equator.	8*a*. *R. Roemerianae.*
Urediniospore-pores in one band.	
Urediniospore-pores superequatorial.	14*b* (28). *R. Caesalpiniae.*
Urediniospore-pores subequatorial.	5. *R. Leucaenae.*
Urediniospore-wall evenly thick.	
Urediniospore-pores in one or two bands.	
Urediniospore-pores in one superequatorial band.	14*b* (28). *R. Caesalpiniae.*
Urediniospore-pores in one equatorial band.	
Paraphyses thickened above.	

Paraphyses cylindric, incurved, irregularly thickened on convex side. 7a. *R. australis.*
Paraphyses clavate or capitate, thickened at apex.
Urediniospore-apex acute.
Urediniospore-pores 4. 4a. *R. Lysilomae.*
Urediniospore-pores 6. 4c. *R. annulata.*
Urediniospore-apex rounded or acutish.
Urediniospores fusiform-oval, 28–42 μ long. 4. *R. arizonica.*
Urediniospores globoid or broad-ellipsoid, 22–25 μ long. 7. *R. mexicana.*
Urediniospores oblong or narrow-ellipsoid, 25–33 μ long.
Telial head smooth. 6. *R.Leucaenae-microphyllae.*
Telial head tuberculate. 12a. *R. Stevensii.*
Paraphyses not thickened above.
Urediniospores obovate or ellipsoid, 23–32 μ long.
Paraphyses incurved, the wall 1.5–2 μ thick. 7a. *R. australis.*
Paraphyses erect, the wall thin, 0.5 μ. 7b. *R. inquirenda.*
Urediniospores ovoid, 30–45 μ long. 8. *R. gracilis.*
Urediniospore-pores in two bands.
Pore-bands equidistant from equator.
Urediniospores echinulate. 8a. *R. Roemerianae.*
Urediniospores verrucose.
Paraphyses thin-walled, 1–2 μ.
Urediniospores 11–17 μ broad. 9. *R. siliquae.*
Urediniospores 15–22 μ broad. 10. *R. Acaciae-pennatulae.*
Paraphyses rather thick-walled, 2–4 μ. 10a. *R. Thornberiana.*
Pore-bands at and below the equator.
Urediniospores 24–33 μ long; teliospores smooth. 11. *R. versatilis.*
Urediniospores 21–26 μ long; teliospores tuberculate. 6b. *R. bizonata.*
Urediniospore-pores scattered, numerous.
Paraphyses with wall thicker above.
Paraphyses clavate.
Telial heads smooth. 7c. *R. Reticulatae.*
Telial heads papillate. 12. *R. expansa.*
Paraphyses capitate or clavate-capitate.
Urediniospore-wall thin, 1 μ.
Urediniospores globoid or broadly ellipsoid, 16–19 μ long.
Telial heads tuberculate. 13. *R. igualica.*
Telial heads smooth. 13a. *R. Gooddingii.*
Urediniospores ellipsoid or obovoid, 18–22 μ long. 15. *R. mimosicola.*
Urediniospore-wall moderately thick, 1.5–2.5 μ.
Urediniospores 18–20 × 18–24 μ. 14. *R. texensis.*
Urediniospores 13–18 × 15–20 μ. 14a. *R. Morongiae.*
Paraphyses cylindric or somewhat spatulate, slightly thickened at apex.
Urediniospore-pores 6–8. 5a. *R. verrucosa.*
Urediniospore-pores 8 or more. 16. *R. fragrans.*
Paraphyses with wall evenly thick.
Paraphyses clavate. 17. *R. Mimosae-caeruleae.*
Paraphyses clavate-capitate or spatulate.
Urediniospores closely verrucose. 18. *R. Mimosae-albidae.*
Urediniospores moderately echinulate. 18a. *R. Mainsiana.*
Host belonging to family Caesalpiniaceae.
Uredinial paraphyses absent.
Urediniospore-wall evenly thick.
Urediniospore-pores in two irregular bands. 18b. *R. Hoffmanseggiae.*
Urediniospore-pores scattered.
Urediniospores 12–17 × 13–26 μ.
Urediniospores closely verrucose. 19. *R. cassiaecola.*
Urediniospores echinulate. 20. *R. indica.*
Urediniospores 16–20 × 20–29 μ.
Urediniospores moderately or sparsely echinulate. 21. *R. mesillana.*
Urediniospores closely echinulate. 22. *R. portoricensis.*
Urediniospore-wall thicker above, the pores equatorial.
Urediniospores ellipsoid or obovoid, the apex rounded. 22a. *R. cubensis.*

Urediniospores lance-ovoid, the apex acute.	2b. *R. distans.*
Uredinial paraphyses present.	
Paraphyses colorless, few.	
Telial heads usually smooth.	21. *R. mesillana.*
Telial heads tuberculate.	
Urediniospore-wall rather thin, 1.5–2 μ.	24. *R. spinulosa.*
Urediniospore-wall rather thick, 2–2.5 μ.	
Teliospores with one papilla each.	25. *R. papillifera.*
Teliospores mostly without a papilla.	25a. *R. Cassiae-Covesii.*
Paraphyses colored, abundant.	
Paraphyses clavate; urediniospore-wall 1.5–2 μ thick.	26. *R. inconspicua.*
Paraphyses capitate; urediniospore-wall 1 μ thick.	27. *R. Humphreyana.*
Host belonging to family Fabaceae.	
Uredinial paraphyses absent.	
Urediniospore-wall thicker above, the pores equatorial.	29. *R. Talpa.*
Urediniospore-wall evenly thick.	
Urediniospore-pores equatorial; urediniospores verrucose.	30. *R. epiphylla.*
Urediniospore-pores scattered.	
Urediniospores echinulate-verrucose.	31. *R. irregularis.*
Urediniospores echinulate.	
Urediniospore-wall thin, 1–1.5 μ, pale-yellow.	32. *R. caulicola.*
Urediniospore-wall thick, 2–3 μ, chestnut-brown.	33. *R. Brongniartiae.*
Urediniospore-pores scattered, but near equator; urediniospore-wall thick, 2–3 μ, chestnut-brown.	34. *R. similis.*
Uredinial paraphyses present; urediniospore-wall evenly thick.	
Urediniospore-pores 4 or less, equatorial.	34a. *R. Lonchocarpi.*
Urediniospore-pores 7 or more, scattered.	
Paraphyses with evenly thick wall.	
Urediniospore-wall thin, 1–1.5 μ.	35. *R. Piscidiae.*
Urediniospore-wall thick, 3 μ.	36. *R. laevis.*
Paraphyses with wall thicker above.	37. *R. Indigoferae.*
Host belonging to family Euphorbiaceae.	38. *R. appendiculata.*

132. **Ravenelia Ingae.**

Add the synonyms: *Uromyces ingicola* P. Henn. Hedwigia **41**: 157. 1904. *Uromyces porcensis* Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 459. 1913. *Ravenelia Whetzelii* Arth. Mycologia **9**: 64. 1917. *Haploravenelia Ingae* Sydow, Ann. Myc. **19**: 165. 1921.

Substitute the following description for uredinia:

II. Uredinia amphigenous, subepidermal, ruptured epidermis conspicuous; the primary form causing no or slight hypertrophy, circinating about the pycnia in areas 1–6 mm. in diameter, somewhat tardily naked, pulverulent, dark cinnamon-brown; urediniospores variable in size and shape, obovoid, clavate, or obovoid-fusiform, 15–26 by 23–55 μ, usually large, 32–40 μ long or sometimes very large, 37–55 μ long; wall golden-brown, 1.5–4 μ thick, thicker above, 3–10 μ, prominently striate or rugose longitudinally with more or less evident reticulations, especially noticeable on the large spores, sometimes verrucose-striate above and nearly or quite smooth below, the pores 3 or 4, equatorial; the secondary form occasionally caulicolous, often covering and deforming the leaf-stalks and young shoots, confluent on the leaves in irregular patches 0.5–2.5 cm. across, early naked, highly pulverulent, cinnamon-brown; urediniospores broadly ellipsoid or obovoid, 13–19 by 18–26 μ; wall golden-brown, 1.5–2 μ thick, sometimes thicker above, 3–5 μ, moderately or sparsely echinulate, the pores 3, or occasionally 4, equatorial; paraphyses none.

Add the hosts:

Inga edulis Mart., Guatemala.
Inga laurina (Sw.) Willd., Porto Rico.
Inga leptopoda Benth., Costa Rica.
Inga Preussii Harms., Salvador.

Add: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 460. *f. 9.*

133. Insert:

1a. **Ravenelia havanensis** Arth. Bull. Torrey Club **48**: 35. 1921.

O. Pycnia amphigenous, petiolicolous, and on young, swollen shoots, thickly scattered, prominent, punctiform, hemispheric or subconic, smoky-brown, subcuticular, 130–250 μ broad by 65–80 μ high; hymenium flat; ostiolar filaments wanting.

II. Uredinia of the primary form following the pycnia, scattered, of the secondary form epiphyllous and somewhat petiolicolous, in small groups or solitary, subcuticular, soon naked, cinnamon-brown, irregularly rounded, 0.3–0.6 mm. across, ruptured cuticle noticeable; paraphyses wanting; urediniospores obovate-oblong or linear-oblong, 13–18 by 26–38 μ, rounded or acute above; wall pale- or cinnamon-brown, paler below, 1.5–2 μ thick, sometimes a little thickened above, 2–4 μ, sparsely and prominently echinulate, the pores 4, equatorial.

III. Telia epiphyllous, in irregular groups, subcuticular, early naked, ruptured cuticle noticeable; teliospore-heads chestnut-brown, 4–6 cells across, oblong-hemispheric, 65–85 by 65–70 μ across, 45–55 μ high, each spore bearing 4–6 straight, subconic, hyaline tubercles, 2–3 μ long; cysts hyaline, globoid, small, not readily bursting in water; pedicel hyaline, very short.

ON MIMOSACEAE:
Enterolobium cyclocarpum (Jacq.) Griseb., Cuba.
TYPE LOCALITY: Capdevila, Havana, Cuba, on *Enterolobium cyclocarpum*.
DISTRIBUTION: Known only from the type locality.

133. **Ravenelia Pithecolobii.**

Add the host: *Pithecolobium tortum* Mart., Cuba.

133. Insert:

2a. **Ravenelia Siderocarpi** Long, Bot. Gaz. **64**: 57. 1917.

O. Pycnia unknown.

II. Uredinia chiefly epiphyllous, scattered, bullate or oval, 0.1–0.8 mm. across, often encircling a central sorus, chestnut-brown, subcuticular, long covered by the cuticle, ruptured cuticle prominent; paraphyses none; urediniospores obovate, obovate-elliptic or subpyriform, 15–18 by 25–37 μ; wall brownish-yellow, thick, 2.5–3.5 μ, slightly if at all thicker above, echinulate, the pores evident, 6, equatorial.

III. Telia chiefly epiphyllous, sparse, scattered, small, 0.1–0.5 mm. across, bullate or elliptic, subcuticular, blackish-brown, tardily naked, ruptured cuticle prominent; paraphyses none; teliospore-heads chestnut-brown, subglobose, 40–60 μ in diameter, 2–4 cells across, each spore bearing 3–6 short hyaline tubercles, 3–5 μ long; cysts as many as the marginal spores, 4–8, globoid, pendant, not cohering, readily swelling and bursting in water; pedicel hyaline, short, deciduous.

ON MIMOSACEAE:
Pithecolobium flexicaule (Benth.) Coulter (*Siderocarpos flexicaulis* Small), Texas.
TYPE LOCALITY: Brownsville, Texas, on *Siderocarpos flexicaulis*.
DISTRIBUTION: Southernmost Texas.

2b. **Ravenelia distans** Arth. & Holway, Am. Jour. Bot. **5**: 424. 1918.

O. Pycnia unknown.

II. Uredinia not seen; urediniospores in the telia lance-ovoid, 12–15 by 19–26 μ, usually acute above, somewhat narrowed below; wall cinnamon-brown, thin, 1 μ, much thicker above, 3–7 μ, moderately echinulate, the pores 4, equatorial.

III. Telia hypophyllous, scattered, round or oblong, 0.2–0.5 mm. across, early naked, subepidermal, chestnut-brown, ruptured epidermis evident; teliospore-heads chestnut-brown, 4–6 cells across, 55–75 μ in diameter, each spore with 6–8 semihyaline spines about 3 μ long; cysts adnate to the lower side of the marginal cells.

ON MIMOSACEAE:
Gen. et sp. indet., Guatemala.
TYPE LOCALITY: Retalhuleu, Guatemala, on undetermined host.
DISTRIBUTION: Known only from the type locality.

133. **Ravenelia arizonica.**

Insert the synonym: *Ravenelia Prosopidis* Long, Bot. Gaz. **64**: 58. 1917.

Emend the description of the uredinia to read: "wall cinnamon-brown, rounded or acutish and darker above, thick, 2–3 μ, not or slightly thicker at apex."

In the description of the telia, for " bearing a central spine, 4–6 μ long " read: " bear-

ing a central tubercle varying from a barely perceptible papilla (rarely none) up to a spine 4–6 μ long."

Add the host: *Prosopis glandulosa* Torr., California, New Mexico, Texas.

Omit the third host.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 12, f. 122.*

Add the exsiccati: Barth. Fungi Columb. *2681;* Barth. N. Am. Ured. *483, 1280.*

134. Insert:

4a. **Ravenelia Lysilomae** Arth. Bot. Gaz. **39**: 392. 1905.

Dendroecia Lysilomae Arth. Résult. Sci. Congr. Bot. Vienne 340. 1906.

Transfer here from page 146 everything relating to this species, inserting:

II. Uredinia chiefly hypophyllous, scattered or in small groups, minute, 0.3–0.5 mm. in diameter, cinnamon-brown; paraphyses numerous, cylindric or clavate, 7–10 by 30–40 μ, yellowish-brown, paler below; urediniospores ovate or ovate-pyriform, 15–23 by 22–35 μ; wall brownish-yellow, 1.5 μ thick, minutely verrucose, the pores 4, equatorial.

Adding the host: *Lysiloma bahamensis* Benth., Cuba.

And adding: EXSICCATI: Barth. Fungi Columb. *4626;* Barth. N. Am. Ured. *1112.*

4b. **Ravenelia sololensis** Arth. & Holway, Am. Jour. Bot. **5**: 425. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous and fructicolous, scattered, round or elliptic, 0.2–0.5 mm. across, on fruit up to 4 mm. long, early naked, subcuticular, pulverulent, dark chestnut-brown, ruptured cuticle conspicuous; paraphyses intermixed with the spores, clavate-capitate, 13–16 by 64–87 μ, the wall colorless below, chestnut-brown above, 0.5 μ thick below, 3–4 μ thick above; urediniospores ellipsoid, or broadly obovoid, 16–19 by 27–35 μ; wall light chestnut-brown above, paler below, 1.5 μ thick, sometimes a little thicker above, up to 3 μ, moderately echinulate, the pores 4, equatorial.

III. Telia amphigenous and fructicolous, scattered, round, or elongate-elliptic, 0.2–0.4 mm. across, on fruit up to 6 mm. long, early naked, subcuticular, dark chestnut-brown, ruptured cuticle conspicuous; teliospore-heads chestnut-brown, 7–9 cells across, 70–107 μ in diameter, each spore with 4–6 nearly colorless spines, about 3 μ long; cysts attached beneath the head.

ON MIMOSACEAE:
Lysiloma acapulcensis (Kunth) Benth., Guatemala.
TYPE LOCALITY: Solola, Guatemala, on *Lysiloma acapulcensis.*
DISTRIBUTION: Known only from the type locality.

4c. **Ravenelia annulata** Long, Bot. Gaz. **61**: 423. 1916.

O. Pycnia unknown.

II. Uredinia epiphyllous, few, elliptic, small, less than 0.5 mm. across, subepidermal, tardily naked, ruptured epidermis conspicuous; paraphyses few, clavate or subcylindric, 8–16 by 36–70 μ, the wall 2–3 μ thick, thicker above, 5–7 μ, light chestnut-brown above, paler below; urediniospores ovate, or ovate-fusiform, asymmetric, usually prominently acuminate above and narrowed below, 17–23 by 27–37 μ; wall cinnamon-brown, paler below, and with a broad hyaline ring at the equator, the pores 6, small, equatorial.

III. Telia epiphyllous, narrowly elliptic, 0.5–1 μ long, subepidermal, light chestnut-brown, tardily naked, ruptured epidermis conspicuous; paraphyses numerous, peripheral, like those of the uredinia; teliospore-heads light chestnut-brown, irregularly oval, flattened, 4–7 cells across, 50–73 by 53–87 μ, smooth; cysts colorless, one to each marginal cell, appressed, extending from pedicel to periphery, united laterally, easily bursting in water; pedicel colorless, short, deciduous.

ON MIMOSACEAE:
Lysiloma bahamensis Benth., Florida.
TYPE LOCALITY: Miami, Florida, on "*Lysiloma latisiliqua,*" a name often used for *L. bahamensis.*
DISTRIBUTION: Southern Florida.
EXSICCATI: Barth. N. Am. Ured. *1882.*

134. **Ravenelia Leucaenae.**

Add the host: *Leucaena pulverulenta* (Schlecht.) Benth., Texas.

Add the exsiccati: Barth. Fungi Columb. *2474, 2578.*

134. Insert:

5a. **Ravenelia verrucosa** Cooke & Ellis, Grevillea **15**: 112. 1887.

Dendroecia verrucosa Arth. Résult. Sci. Congr. Bot. Vienne 340. 1906.

Transfer here from pages 146 and 147 everything relating to this species, inserting:

II. Uredinia chiefly epiphyllous, small, 0.5–1 mm. in diameter, subepidermal; paraphyses numerous, cylindric or clavate, incurved, 6–10 by 35–60 μ long, chestnut-brown; urediniospores globoid or ovate, 15–18 by 17–20 μ; wall yellowish-brown, finely echinulate, the pores 6–8, scattered.

134. **Ravenelia Leucaenae-microphyllae.**

Substitute this description of the uredinia:

II. Uredinia hypophyllous, on purple spots, 0.2–0.5 mm. across, subepidermal, early naked, somewhat pulverulent, cinnamon-brown, ruptured epidermis evident; paraphyses intermixed with the spores, erect, clavate-capitate, 10–15 by 50–77 μ, the wall chestnut-brown above, colorless below, very thin, 0.5 μ at sides, thicker above, 3–5 μ; urediniospores oblong or elongate-ellipsoid, 13–16 by 26–35 μ; wall cinnamon-brown, 1–1.5 μ thick, somewhat thicker above, 2–3 μ, finely and moderately echinulate, the pores 4, equatorial.

In the note following the description of the species omit the first two sentences, and extend the final sentence by adding " and by the form of the urediniospores and paraphyses."

For the host, which was erroneously determined, substitute: *Acacia angustissima* (Mill.) Kuntze, Guerrero; Guatemala.

For the distribution read: "Southern Mexico and Guatemala."

134. Insert:

6a. **Ravenelia Cebil** Speg. Anal. Mus. Nac. Buenos Aires **19**: 295. 1909.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, round, small, 0.2–0.4 mm. in diameter, subcuticular, early naked, dark cinnamon-brown, ruptured cuticle inconspicuous; paraphyses numerous, scattered among the spores, capitate, 12–14 by 35–48 μ, the wall light chestnut-brown above, paler below, 1–1.5 μ thick, greatly thickened above, 7–10 μ; urediniospores elongate-obovate or ellipsoid, 12–18 by 18–30 μ; wall cinnamon-brown above, paler below, 1–1.5 μ thick, often slightly thicker above, 2–3 μ, closely and inconspicuously echinulate, appearing nearly smooth in water, the pores 4, equatorial.

III. Telia amphigenous, scattered, small, subcuticular, cinnamon-brown, ruptured cuticle inconspicuous; teliospore heads cinnamon-brown, flattened-hemispheric, 5–100 μ in diameter, smooth; cysts colorless, few; pedicel short, colorless, deciduous.

ON MIMOSACEAE:
Piptadenia peregrina (L.) Benth., Porto Rico.
TYPE LOCALITY: Tucumán, Argentina, on *Piptadenia macrocarpa.*
DISTRIBUTION: Porto Rico; also in South America.

6b. **Ravenelia bizonata** Arth. & Holway, Am. Jour. Bot. **5**: 424. 1918.

O. Pycnia unknown.

II. Uredinia epiphyllous, scattered or somewhat grouped, round or oval, 0.2–0.4 mm. across, early naked, subcuticular, pulverulent, dark chestnut-brown, ruptured cuticle inconspicuous; paraphyses intermixed with the spores, capitate or clavate-capitate, 15–19 by 23–48 μ, the wall golden-brown above, colorless below, 1–1.5 μ thick, much thicker above, 7–10 μ; urediniospores ellipsoid or obovoid, 15–19 by 20–26 μ; wall dark cinnamon-brown above, paler below, thin, 1–1.5 μ, sometimes slightly thicker above, very finely and closely echinulate below, usually smooth at apex, the pores 6–8 in two bands, one equatorial, the other subequatorial.

III. Telia usually epiphyllous, scattered, round, 0.1–0.3 mm. in diameter, soon naked, subcuticular, chestnut-brown, ruptured cuticle noticeable; teliospore-heads hemispheric, 4–6 cells across, 55–75 μ in diameter, each spore with 2–4 colorless tubercles, 3–10 μ long; cysts attached to the lower side of each marginal cell.

ON MIMOSACEAE:
Calliandra Houstoniana (Mill.) Standl. (*C. Houstoni* Benth.), Guatemala.
TYPE LOCALITY: Guatemala City, Guatemala, on *Calliandra Houstoni*.
DISTRIBUTION: Central Guatemala.

6c. **Ravenelia ectypa** Arth. & Holway, Mycologia **10**: 120. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or somewhat grouped, round, 0.5–1 mm. in diameter, early naked, subcuticular, pulverulent, cinnamon-brown, ruptured cuticle evident; paraphyses none; urediniospores broadly ellipsoid or obovoid, 17–19 by 19–26 μ; wall golden-brown, uniformly thin, 1 μ, moderately echinulate, the pores 6 or 7, scattered.

III. Telia amphigenous, scattered, round, 0.4–1 mm. in diameter, early naked, subcuticular, dark chestnut-brown, ruptured cuticle evident; teliospore-heads hemispheric, usually consisting of four central and six marginal spores, 42–60 μ in diameter, each spore bearing 4–12 light-brown spines, 3–5 μ long; cysts attached to the lower side of the marginal cells.

ON MIMOSACEAE:
Calliandra gracilis Klotzsch, Guatemala; Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Calliandra gracilis*.
DISTRIBUTION: Central America.

134. **Ravenelia mexicana.**

Insert the synonym: *Haploravenelia mexicana* Sydow, Ann. Myc. **19**: 165. 1921.
Add the illustration: Sydow, Monog. Ured. **3**: *pl. 10, f. 103.*

135. Insert:

7a. **Ravenelia australis** Dietel & Neger, Bot. Jahrb. **24**: 161. 1897.

O. Pycnia unknown.

II. Uredinia amphigenous, very small, punctiform or oval, less than 0.5 mm. across, subepidermal, soon naked, ruptured epidermis inconspicuous; paraphyses peripheral, very abundant, cylindric, incurved, 10–17 by 50–67 μ, the wall about 2.5 μ thick, nearly colorless below, ferruginous above; urediniospores obovate or elliptic-obovate, 13–20 by 25–32 μ; wall light cinnamon-brown, 1.5–2 μ thick, slightly or no thicker above, echinulate, the pores 4–6, equatorial.

III. Telia amphigenous, punctiform or oval, less than 0.5 mm. across, subepidermal, early naked, blackish-brown, ruptured epidermis inconspicuous; paraphyses abundant, peripheral, like those of the uredinia; teliospore-heads chestnut-brown, hemispheric, 7–11 cells across, 67–110 μ in diameter, smooth; cysts small, numerous, subglobose, subappressed beneath entire head in two rows, readily swelling and bursting in water; pedicel short, hyaline, deciduous.

ON MIMOSACEAE:
Vachellia Farnesiana (L.) Wight & Arn. (*Acacia Farnesiana* Willd.), Texas.
TYPE LOCALITY: Concepcion, Chile, on *Acacia Cavenia*.
DISTRIBUTION: Southern Texas; also in South America.
EXSICCATI: Barth. N. Am. Ured. *2577.*

7b. **Ravenelia inquirenda** Arth. & Holway, Am. Jour. Bot. **5**: 423. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or somewhat grouped, roundish, 0.1–0.3 mm. across, rather tardily naked, subepidermal, opening by a slit or pore, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; paraphyses intermixed with the spores, cylindric or clavate-capitate, 7–10 by 26–42 μ, the wall cinnamon-brown, uniformly

about 0.6 μ thick; urediniospores ellipsoid, 15–18 by 23–29 μ; wall cinnamon-brown, moderately thick, 1.5–2 μ, echinulate, the pores 4, equatorial.

III. Telia unknown.

ON MIMOSACEAE:
Acacia bursaria Schrenck, Guatemala.
TYPE LOCALITY: Laguna, Lake Amatitlan, Guatemala, on *Acacia bursaria*.
DISTRIBUTION: Known only from the type locality.

7c. **Ravenelia Reticulatae** Long, Bot. Gaz. **61**: 421. 1916.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, punctiform or elliptic, small, 0.3–0.5 mm. across, subcuticular, tardily naked, light cinnamon-brown, ruptured cuticle noticeable; paraphyses intermixed with the spores, clavate or spatulate, 10–13 by 40–70 μ, the wall fulvous above, hyaline below, thicker above, 5–8 μ; urediniospores globoid, 16 by 16–19 μ; wall pale-fulvous, 1–1.5 μ thick, densely verrucose, the pores 6–10, scattered.

III. Telia amphigenous, scattered, oval or orbicular, 0.5–1.5 mm. across, subcuticular, early naked, chestnut-brown, ruptured cuticle noticeable; paraphyses few; teliospore-heads light chestnut-brown, 7–9 cells across, 65–105 μ in diameter, smooth; cysts appressed to under side of head, free, swelling slowly and bursting in water; pedicel short, hyaline, deciduous.

ON MIMOSACEAE:
Calliandra humilis (Schlecht.) Benth., Arizona.
Calliandra reticulata A. Gray, Arizona.
TYPE LOCALITY: Divide, Lower Trail, Rincon Mountains, Arizona, on *Calliandra reticulata*.
DISTRIBUTION: Mountains of Arizona.
EXSICCATI: Barth. N. Am. Ured. *2283, 2480*.

135. **Ravenelia gracilis.**

The host is: *Pithecolobium brevifolium* Benth. (*Havardia brevifolia* Small), Texas; San Luis Potosí.

Change the distribution to read: Southernmost Texas southward to central Mexico.

135. Insert:

8a. **Ravenelia Roemerianae** Long, Bot. Gaz. **64**: 59. 1917.

O. Pycnia few, amphigenous and fructicolous, 6–20 in orbicular groups 0.5–1 mm. across, blackish-brown, subcuticular, flattened-hemispheric, 70–105 μ in diameter, 25–38 μ high.

II. Uredinia usually fructicolous but also amphigenous, scattered, or on pods often densely confluent over areas 1–5 mm. across, subcuticular, irregularly oval, 0.2–0.6 mm. across, yellowish-brown, ruptured cuticle prominent; paraphyses abundant, intermixed with the spores, clavate or clavate-capitate, 9–13 by 35–50 μ, the wall thin and colorless, thicker above, 3 μ, and fulvous; urediniospores obovate-oblong or linear-oblong, 10–14 by 27–38 μ, somewhat larger on the pods; wall golden-brown above, paler or colorless below, thin, 1–1.5 μ, slightly thicker above, 1.5–3 μ, sparsely and prominently echinulate below, much less so above, the pores 8, in two bands of 4 each, equidistant from the equator.

III. Telia amphigenous, scattered, subcuticular, blackish, shining, irregularly oval, 0.2–1.2 mm. across, ruptured cuticle noticeable; paraphyses similar to those of the uredinia; teliospore-heads blackish, 5–7 cells across, 63–100 μ in diameter, each spore bearing 3–10 colorless papillae about 2 μ high and 3 μ broad; cysts colorless, one to each marginal spore, appressed from periphery to pedicel and united laterally, slow to burst in water; pedicel short, colorless, deciduous.

ON MIMOSACEAE:
Acacia Roemeriana Scheele, Texas.
TYPE LOCALITY: San Marcos, Texas, on *Acacia Roemeriana*.
DISTRIBUTION: Southwestern Texas.
EXSICCATI: Barth. N. Am. Ured. *1885*.

135. **Ravenelia siliquae.**

Insert the synonym: *Haploravenelia siliquae* Sydow, Ann. Myc. **19**: 165. 1921.

135. **Ravenelia Acaciae-pennatulae.**

Insert the synonym: *Haploravenelia Acaciae-pennatulae* Sydow, Ann. Myc. **19**: 165. 1921.

Add: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 9, f. 92.* EXSICCATI: Barth. N. Am. Ured. *78.*

135. Insert:

10a. **Ravenelia Thornberiana** Long, Bot. Gaz. **61**: 420. 1916.

O. Pycnia unknown.

II. Uredinia amphigenous, caulicolous and fructicolous, usually forming rather dense witches' brooms 3–6 cm. long, thickly covering large areas and often confluent, irregularly elliptic, small, 0.2–0.5 mm. across, subcuticular, early naked, cinnamon-brown, ruptured cuticle noticeable; paraphyses abundant, intermixed with the spores, clavate or subcapitate, 10–15 by 35–57 μ, the wall 2–3 μ thick, fulvous above, colorless below; urediniospores obovate or oval, 16–18 by 20–27 μ; wall cinnamon-brown, 1.5–2 μ thick, densely and evenly verrucose, the pores 8–12, in two bands of 4–6 each, equidistant from equator.

III. Telia amphigenous and caulicolous, scattered, or sometimes confluent on petioles and stems, subcuticular, chestnut-brown, ruptured cuticle noticeable; paraphyses with stipe usually solid, otherwise as in the uredinia; teliospore-heads chestnut-brown, 4 or 5 cells across, 70–90 μ in diameter, smooth; cysts delicate, numerous in two encircling rows, becoming pendent and subglobose in water, easily swelling and bursting; pedicel short, hyaline, deciduous.

ON MIMOSACEAE:
Acacia constricta Benth., Zacatecas.
Acacia constricta paucispina Wooton & Standley, Arizona, Texas.
TYPE LOCALITY: El Paso, Texas, on *Acacia constricta paucispina.*
DISTRIBUTION: Southwestern Texas and southern Arizona into northern Mexico.

136. **Ravenelia versatilis.**

Add the synonym: *Haploravenelia versatilis* Sydow, Ann. Myc. **19**: 165. 1921.
Add the illustration: Sydow, Monog. Ured. **3**: *pl. 9, f. 91.*
Add: EXSICCATI: Barth. N. Am. Ured. *2179;* Ellis, N. Am. Fungi *1440.*

136. **Ravenelia expansa.**

Add the synonym: *Haploravenelia expansa* Sydow, Ann. Myc. **19**: 165. 1921.
Add: EXSICCATI: Barth. N. Am. Ured. *179.*

136. Insert:

12a. **Ravenelia Stevensii** Arth. Mycologia **7**: 178. 1915.

O. Pycnia unknown.

II. Uredinia hypophyllous, numerous, scattered, round, small, 0.1–0.3 mm. across, subcuticular, early naked, dull cinnamon-brown, ruptured cuticle inconspicuous; paraphyses in a thick peripheral ring, upright, capitate or clavate, 9–12 by 37–45 μ, smooth, the wall of head 2–5 μ thick, cinnamon-brown, passing into the thin-walled colorless stipe; urediniospores oblong, cylindric-oblong, or narrowly obovoid, 8–13 by 25–30 μ; wall cinnamon-brown, paler below, uniformly thin, 1 μ, slightly thicker above, finely and inconspicuously verrucose-echinulate, the pores usually indistinct, about 4, equatorial.

III. Telia hypophyllous, few, very small, subcuticular, blackish-brown; teliospore-heads chestnut-brown, 3–6 cells across, 40–63 μ in diameter, each spore bearing 1–3 nearly hyaline tubercles, 2–3 μ thick, 6–19 μ long, 2- or 3-forked above; cysts hyaline, globoid, extending from periphery to pedicel, not bursting in water; pedicel hyaline, short, usually disappearing.

ON MIMOSACEAE:
Acacia riparia H.B.K., Porto Rico; St. Thomas.
TYPE LOCALITY: Guayanilla, Porto Rico, on *Acacia riparia.*
DISTRIBUTION: West Indies.

136. **Ravenelia igualica.**

Add the synonym: *Haploravenelia igualica* Sydow, Ann. Myc. **19**: 165. 1921.

Add: EXSICCATI: Barth. Fungi Columb. *2473.*

137. Insert:

13a. **Ravenelia Gooddingii** Long, Bot. Gaz. **72**: 41. 1921.

O. Pycnia unknown.

II. Uredinia hypophyllous, scattered, small, early naked, subcuticular, cinnamon-brown; paraphyses abundant, intermixed with the spores, terete or narrowly clavate, with thick walls, fulvous above, passing into the solid hyaline stipe, 10–14 by 40–50 μ, or obovate, with thin subhyaline walls, 15–18 by 30–55 μ; urediniospores broadly oval or globoid, 12–16 by 16–19 μ; wall pale-fulvous, thin, 1–1.5 μ, verrucose, the pores 6–8, scattered.

III. Telia chiefly hypophyllous, often on pallid spots, irregularly oblong, 0.5–1.5 by 2–4 mm., often confluent over considerable areas, subcuticular, early naked, chocolate-brown, shining, ruptured cuticle inconspicuous; paraphyses none; teliospore-heads light chestnut-brown, 5–6 cells across, 60–80 μ in diameter, smooth; cysts hyaline, appressed in two encircling rows, readily swelling and bursting in water; pedicel short, colorless, deciduous.

ON MIMOSACEAE:
Acacia suffrutescens Rose, Arizona.
TYPE LOCALITY: Baboquivari Mountains, Arizona, on *Acacia suffrutescens.*
DISTRIBUTION: Known only from the type locality.

137. **Ravenelia texensis.**

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 11, f. 112.*

137. Insert:

14a. **Ravenelia Morongiae** Long, Bot. Gaz. **61**: 418. 1916.

O. Pycnia unknown.

II. Uredinia amphigenous and caulicolous, sometimes causing hypertrophy of young shoots, scattered or confluent over large areas, ovoid on leaves, often oblong on branches, subcuticular, early naked, light cinnamon-brown, pulverulent, ruptured cuticle inconspicuous; paraphyses numerous, intermixed with the spores, variable in size and shape, clavate or subcapitate, 12–20 by 40–60 μ, the wall thin, 1 μ, and colorless, somewhat thicker, about 3 μ, and cinnamon-brown above, the stipe occasionally solid; urediniospores broadly oval or globose, 14–18 by 15–20 μ; wall 1.5–2 μ, fulvous, densely verrucose-spinulose, the pores 8–12, scattered.

III. Telia hypophyllous, scattered, small, inconspicuous, irregularly oval, subcuticular, early naked, blackish, shining, ruptured cuticle inconspicuous; teliospore-heads chestnut-brown, strongly convex above, 4–6 cells across, 50–70 μ in diameter, smooth; cysts colorless, few, about as many as the peripheral cells, closely appressed to under side of head, slowly swelling and bursting in water; pedicel very short, colorless, deciduous.

ON MIMOSACEAE:
Morongia diffusa Rose (*Schrankia diffusa* Rose), Colima.
Morongia uncinata (Willd.) Britton (*Schrankia uncinata* Willd.), Texas.
TYPE LOCALITY: Austin, Texas, on *Morongia uncinata.*
DISTRIBUTION: Central Texas to southwestern Mexico.

14b. **Ravenelia Caesalpiniae** Arth. Bull. Torrey Club **31**: 5. 1904.

Transfer this species from page 141.

Add the synonym: *Uromyces Caesalpiniae* Arth. Mycologia **7**: 183. 1915.

Substitute for all that follows the description of the uredinia:

III. Telia amphigenous, similar in size and appearance to the uredinia only darker in color, chocolate-brown, subcuticular, ruptured epidermis noticeable; paraphyses wanting; teliospore-heads chocolate-brown, consisting of 2–8 spores irregularly grouped, or more commonly of a single, uromyces-like spore, each spore being obovoid, 15–22 by 23–32 μ,

usually narrowed below, rounded or obtuse above, smooth; cysts absent; pedicel (one to each spore) somewhat tinted, 5–7 μ thick, half length of spore or shorter.

ON MIMOSACEAE:
Mimosa ceratonia L., Porto Rico; St. Thomas.
TYPE LOCALITY: Near Bayamon, Porto Rico, on "*Caesalpinia* sp.," error for *Mimosa ceratonia*.
DISTRIBUTION: West Indies.

137. **Ravenelia mimosicola.**
Add the illustration: Sydow, Monog. Ured. **3**: *pl. 11, f. 118.*
Add: EXSICCATI: Barth. N. Am. Ured. *484.*

137. **Ravenelia fragrans.**
Add the host: *Mimosa biuncifera* Benth., Arizona.

138. **Ravenelia Mimosae-albidae.**
Add the illustration: Sydow, Monog. Ured. **3**: *pl. 11, f. 116.*
Add: EXSICCATI: Barth. N. Am. Ured. *1183, 1282.*

138. Insert:

18a. **Ravenelia Mainsiana** Arth. & Holway, Am. Jour. Bot. **5**: 426. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, oval, 0.2–0.8 mm. long, subepidermal, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; paraphyses intermixed with the spores, clavate or capitate, 7–16 by 29–45 μ, the wall slightly tinted, uniformly thin, 0.5–1 μ, the stipe often solid; urediniospores ellipsoid or broadly obovoid, 16–18 by 18–23 μ; wall cinnamon-brown, 1.5–2 μ, moderately echinulate, the pores rather indistinct, 8–10, scattered.

III. Telia amphigenous, scattered or in small groups, round or oval, 0.4–0.8 mm. across, subepidermal, soon naked, blackish, ruptured epidermis conspicuous; teliospore-heads irregular, flat, dark chestnut-brown, 3–6 cells across, 55–71 by 74–93 μ, each spore bearing 7–9 spines, up to 3 μ long; cysts colorless, pendent from base of pedicel, swelling and bursting in water; pedicel short, colorless, deciduous.

ON MIMOSACEAE:
Mimosa albida H.B.K., Guatemala; Salvador.
TYPE LOCALITY: Guatemala City, Guatemala, on *Mimosa albida*.
DISTRIBUTION: Known only from the type locality.

18b. **Ravenelia Hoffmanseggiae** Long, Bot. Gaz. **64**: 57. 1917.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, orbicular or irregularly oval, subepidermal, reddish-brown, ruptured epidermis prominent; paraphyses wanting; urediniospores obovate, ellipsoid, or globoid, 16–25 by 25–30 μ; wall golden-brown, uniformly thin, 1–1.5 μ, sparsely and minutely echinulate, appearing smooth when wet, the pores 8, in two bands of 4 pores each, one subequatorial, the other near upper end, in globoid spores the pores often appear scattered.

III. Telia unknown.

ON CAESALPINIACEAE:
Hoffmanseggia oxycarpa Benth., Texas.
TYPE LOCALITY: Del Rio, Texas, on *Hoffmanseggia oxycarpa*.
DISTRIBUTION: Known only from the type locality.

138. **Ravenelia cassiaecola.**
Insert the synonym: *Haploravenelia cassiaecola* Sydow, Ann. Myc. **19**: 165. 1921.
Add the hosts:

Chamaecrista Aeschynomene (DC.) Greene, Porto Rico.
Chamaecrista Swartzii (Wickstr.) Britton (*C. glandulosa* Millsp.), Porto Rico.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 10, f. 107.*
Add the exsiccati: Barth. N. Am. Ured. *582, 1883, 2380.*

139. **Ravenelia indica.**

Insert the synonym: *Haploravenelia indica* Sydow, Ann. Myc. **19**: 165. 1921.

139. **Ravenelia mesilliana.**

Read: **Ravenelia mesillana.**

Insert the synonyms: *Ravenelia Longiana* Sydow, Hedwigia Beibl. **40**: 128. 1901. *Haploravenelia mesillana* Sydow, Ann. Myc. **19**: 165. 1921.

Insert this description of the pycnia:

O. Pycnia amphigenous, crowded in circinating groups 2–4 mm. across, subcuticular, brownish, depressed-hemispheric, 100–165 μ across by 40–60 μ high.

For uredinia and telia combine the descriptions under *R. mesillana* (page 139) and *R. Longiana* (page 140), making size of urediniospores 15–22 by 20–26 μ, and surface of teliospore-heads smooth, or rarely with a few, short, hyaline tubercles, especially on the marginal cells.

Emend the part following the description to read:

ON CAESALPINIACEAE:
Cassia bauhinioides A. Gray, New Mexico.
Cassia Roemeriana Scheele, Texas.
TYPE LOCALITY: Mesilla, New Mexico, on *Cassia bauhinioides.*
DISTRIBUTION: South-central Texas to southern New Mexico.
ILLUSTRATIONS: Bot. Gaz. **35**: *pl. 2, f. 2, 13;* Sydow, Monog. Ured. **3**: *pl. 11, f. 110.*
EXSICCATI: Sydow, Ured. *1736.*

139. **Ravenelia portoricensis.**

Add the synonym: *Haploravenelia portoricensis* Sydow, Ann. Myc. **19**: 165. 1921.

140. Insert:

22a. **Ravenelia cubensis** Arth. Mem. Torrey Club **17**: 118. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered or somewhat grouped, 0.2–1 mm. in diameter, subepidermal, rather tardily naked, cinnamon-brown, pulverulent, ruptured epidermis conspicuous; paraphyses none; urediniospores ellipsoid or obovoid, 16–19 by 23–26 μ; wall golden- or light cinnamon-brown, rather thin, 1–2 μ, thicker above, 3–6 μ, moderately and finely echinulate, the pores 4, equatorial.

III. Telia unknown.

ON CAESALPINIACEAE:
Cassia robiniaefolia Benth., Cuba.
TYPE LOCALITY: Cacocum, Oriente, Cuba, on *Cassia robiniaefolia.*
DISTRIBUTION: Known only from the type locality.

140. **Ravenelia Longiana.**

Becomes a synonym of: 21. **R. mesillana** (above, on this page).

140. **Ravenelia spinulosa.**

Insert the synonym: *Haploravenelia spinulosa* Sydow, Ann. Myc. **19**: 165. 1921.

Add the host: *Cassia biflora* L., Guatemala.

Add: EXSICCATI: Barth. N. Am. Ured. *181, 1484;* Kellerm. Fungi Sel. Guat. *9;* Sydow, Ured. *2089.*

140. **Ravenelia papillifera.**

Insert the synonym: *Haploravenelia papillifera* Sydow, Ann. Myc. **19**: 165. 1921.

Insert this description of the pycnia:

O. Pycnia amphigenous, crowded on discolored spots 1.5–3.5 mm. across, pulvinate, prominent, subcuticular, chestnut-brown, 87–320 μ in diameter by 26–48 μ high; pycniospores colorless, ellipsoid, 2 by 3–4 μ.

Add the exsiccati: Barth. N. Am. Ured. *980, 1979;* Ellis & Ev. Fungi Columb. *1672.*

141. Insert:

25a. **Ravenelia Cassiae-Covesii** Long & Goodding, Bot. Gaz. **72**: 42. 1921.

O. Pycnia unknown.

II. Uredinia amphigenous, scattered, roundish, 1–2 mm. across, subcuticular, early naked, cinnamon-brown, ruptured cuticle inconspicuous; paraphyses few, intermixed with the spores, clavate-capitate or capitate, colorless, 11–13 by 37–66 μ, the walls of head thin, 1–1.5 μ, the stipe solid, 5 μ thick; urediniospores broadly ellipsoid, obovate, or globoid, 15–20 by 17–23 μ; wall cinnamon-brown, 2–2.5 μ thick, verrucose-echinulate, the pores 8, in two irregular bands of 4 pores each, equidistant from the equator, or scattered in the globoid spores.

III. Telia amphigenous and caulicolous, scattered, round, 0.5–1 mm. in diameter, subcuticular, early naked, chocolate-brown, ruptured cuticle inconspicuous; paraphyses few, like those of the uredinia; teliospore-heads chocolate-brown, 5–7 cells across, 50–84 μ in diameter, smooth, or with part of the cells bearing a single low papilla; cysts colorless, numerous, in two or three rows, subappressed, globoid, slowly swelling and bursting in water; pedicel short, colorless, deciduous.

ON CAESALPINIACEAE:
Cassia Covesii A. Gray, Arizona.
TYPE LOCALITY: Near Tucson, Arizona, on *Cassia Covesii*.
DISTRIBUTION: Southern Arizona.

141. **Ravenelia inconspicua.**

Insert the synonym: *Haploravenelia inconspicua* Sydow, Ann. Myc. **19**: 165. 1921.

Emend the uredinial description, making the wall of the paraphyses 1–3 μ thick, often thicker above, 3–9 μ, and the urediniospores 13–16 μ in diameter with the wall 1.5–2 μ thick.

Omit from the host the words " or *Cassia*."

Add the host: *Caesalpinia exostemma* Moc. & Sesse (*Poinciana Conzattii* Rose), Guatemala; Salvador.

141. **Ravenelia Humphreyana.**

Add the synonym: *Haploravenelia Humphreyana* Sydow, Ann. Myc. **19**: 165. 1921.

Add the host: *Caesalpinia Rugeliana* Urban, Cuba.

Add: EXSICCATI: Kellerm. Fungi Sel. Guat. *8;* Sydow, Ured. *2088;* Vesterg. Micr. Rar. Sel. *1307*.

141. **Ravenelia Caesalpiniae.**

Becomes 14b (see page 714).

142. **Ravenelia epiphylla.**

Add the hosts:

Cracca ambigua (M. A. Curtis) Kuntze (*Tephrosia ambigua* Chapm.), Louisiana.
Cracca purpurea L. (*Tephrosia purpurea* Pers.), Salvador.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 12, f. 131.*

Add the exsiccati: Barth. N. Am. Ured. *1884, 2178, 2381, 2578, 2689, 2783, 3178.*

143. **Ravenelia Brongniartiae.**

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 12, f. 128.*

Add the exsiccati: Barth. Fungi Columb. *3478;* Barth. N. Am. Ured. *178, 1281, 1380, 1483, 1581.*

143. **Ravenelia similis.**

Add: EXSICCATI: Barth. N. Am. Ured. *80.*

144. Insert:

34a. **Ravenelia Lonchocarpi** Lagerh. & Dietel, Hedwigia **33**: 46. 1894.

O. Pycnia amphigenous, hemispheric, brown, subcuticular, 80–110 μ in diameter, 40–45 μ high; pycniospores ellipsoid, 2.5 by 3–3.5 μ.

II. Uredinia amphigenous, scattered or crowded in small groups, roundish, 0.3–0.5 mm. across, subepidermal, soon naked, dark cinnamon-brown, pulverulent, ruptured epidermis evident; paraphyses peripheral, incurved, hyphoid, 4–6 by 28–35 μ, the wall thin, 1 μ, somewhat thicker on the convex side, cinnamon-brown above, paler below; urediniospores obovate or ellipsoid, often indented on one side, curved or hamate, 13–20 by 25–32 μ; wall reddish-brown, thin, 1–1.5 μ, sparsely and sharply echinulate, the pores 3 or 4, indistinct, approximately equatorial.

III. Telia amphigenous, scattered, subepidermal, dull-brown; teliospore-heads purplish-brown, low-hemispheric, often irregular, 4 or 5 cells across, 60–90 μ in diameter, rarely larger, each spore bearing 4–7 tinted papillae, 3–6 μ high; cysts delicate, appressed to under side of head extending from periphery to pedicel; pedicel very short, deciduous.

ON FABACEAE:
Lonchocarpus latifolius H.B.K., Cuba.
Lonchocarpus salvadorensis Pittier, Salvador.
TYPE LOCALITY: State of Minas Geraes, Brazil, on *Lonchocarpus* [*campestris*].
DISTRIBUTION: Cuba and Central America; also in South America.
ILLUSTRATIONS: Hedwigia **33**: *pl. 4, f. 17 a–d;* Sydow, Monog. Ured. **3**: *pl. 11, f. 114.*

144. **Ravenelia Piscidiae.**
Add: EXSICCATI: Barth. N. Am. Ured. *677, 780, 2978.*

144. **Ravenelia laevis.**
Add the illustration: Sydow, Monog. Ured. **3**: *pl. 12, f. 130.*
Add: EXSICCATI: Barth. Fungi Columb. *3479, 4279;* Barth. N. Am. Ured. *79, 180.*

144. **Ravenelia Indigoferae.**
Add the host: *Indigofera mucronata* Spreng., Guatemala, and insert *I. suffruticosa* Mill., as a synonym under *Indigofera Anil* L.
Add the illustration: Sydow, Monog. Ured. **3**: *pl. 12, f. 129.*
Add: EXSICCATI: Barth. Fungi Columb. *2475.*

145. **Ravenelia appendiculata.**
Add the host: *Phyllanthus acuminatus* Vahl, Guatemala.
Add the illustrations: E. & P. Nat. Pfl. 1^{1**}: *f. 49D, E;* Sydow, Monog. Ured. **3**: *pl. 12, f. 126.*
Add: EXSICCATI: Barth. N. Am. Ured. *177.*

145. **DENDROECIA.**
Omit the last three lines of the key.

146. **Dendroecia Lysilomae.**
Becomes a synonym of **Ravenelia Lysilomae** (page 709).

146. **Dendroecia verrucosa.**
Becomes a synonym of **Ravenelia verrucosa** (page 710).

147. **Dicheirinia binata.**
Add the synonyms: *Lecythea pezizaeformis* Berk. & Curt. Proc. Am. Acad. **4**: 127. 1858. *Diorchidium binatum* De-Toni, in Sacc. Syll. Fung. **7**: 736. 1888. *Uredo ? peziziformis* De-Toni, in Sacc. Syll. Fung. **7**: 856. 1888. *Uredo Cabreriana* Kern & Kellerm. Jour. Myc. **13**: 25. 1907.

In the description of the telia for the words " one slightly higher on pedicel than the other," substitute: " pedicel with two small cells at distal end on which are borne the two teliospores placed side by side."

Substitute after the description the following:

ON FABACEAE:
Erythrina Crista-galli L., Porto Rico.
Erythrina glauca Willd., Guatemala; Panama; Cuba; Porto Rico.
Erythrina sp., Nicaragua.
TYPE LOCALITY: Nicaragua, on unknown plant [*Erythrina* sp.]
DISTRIBUTION: Central America and the West Indies; also in South America.

147. Insert:

5a. DIABOLE Arth. Bull. Torrey Club **49**: 194. 1922.

Cycle of development includes only subcuticular telia, with a possibility of pycnia.

Telia somewhat indefinite, without paraphyses. Teliospores free, usually paired on a common pedicel, one-celled, more or less adhering laterally; wall colored, usually verrucose, at least above; pore one, in upper part of cell.

1. **Diabole cubensis** Arth. Bull. Torrey Club **49**: 194. 1922.

Uromycladium (?) *cubense* Arth. Mem. Torrey Club **17**: 119. 1918.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, emaculate, scattered, oval or oblong, 0.2–0.4 by 0.5–1 mm., subcuticular, soon naked, pulverulent, chestnut-brown, ruptured cuticle conspicuous; teliospores triangular-obovate or short-pyriform, length and breadth the same, 15–18 μ, remaining attached to pedicel in groups of 2–4 (usually 2), often single; wall at sides colorless, smooth, thin, 1 μ, above chestnut-brown, finely and closely verrucose, thicker, 1.5–2 μ; pedicel in upper part firm, remaining attached to spore, chestnut-brown, 7–9 μ broad by 7–10 μ long, the wall about 1.5 μ thick, in lower part colorless, the wall delicate, colorless, and readily falling away.

ON MIMOSACEAE:
Mimosa pigra L. (*M. asperata* L., *M. Berlandieri* A. Gray), Cuba.
TYPE LOCALITY: Soledad Cienfuegos, Santa Clara, Cuba, on *Mimosa pigra*.
DISTRIBUTION: Cuba.

147. **Pileolaria Toxicodendri.**

Add the synonym: *Uredo Toxicodendri* Berk. & Rav.; Rav. Fungi Car. **3**: *97*, hyponym. 1855.

Replace Colorado after *Rhus diversiloba* by Oregon.

Add the host: *Schmaltzia trilobata* (Nutt.) Greene (*Rhus trilobata* Nutt.), Colorado.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 5, f. 85;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 9, f. 14.*

Add the exsiccati; Barth. Fungi Columb. *2550, 2646, 2853, 2954, 3538, 4051, 4249, 4342;* Barth. N. Am. Ured. *13, 320, 413, 813, 1322, 1514, 1515, 1628, 1737, 1824, 1928, 2220, 2333, 2420, 2528, 2640, 2732, 2822, 2923, 2924, 3219;* Brenckle, Fungi Dak. *22;* Ellis & Ev. Fungi Columb. *175a, b;* Seym. & Earle, Econ. Fungi *503, 504, 505;* Sydow, Ured. *1754.*

148. **Pileolaria extensa.**

Insert the synonym: *Uromyces extensus* Sydow, Monog. Ured. **2**: 148. 1910.

148. **Pileolaria patzcuarensis.**

Add: EXSICCATI: Barth. N. Am. Ured. *1321, 1736.*

149. **Pileolaria mexicana.**

Insert the synonym: *Uromyces propinquus* Sydow, Monog. Ured. **2**: 149. 1910.

Add the host: *Rhus choriophylla* Wooton & Standley, Texas.

Add: EXSICCATI: Barth. N. Am. Ured. *812.*

149. **Discospora effusa.**

Substitute for the host:

Rhus rhomboidea Small, Oklahoma.
Rhus Rydbergii Small, Colorado.
Rhus Toxicodendron L., Arizona.

Append to the type locality: [*Rhus Toxicodendron*].

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 5, f. 86.* EXSICCATI: Barth. N. Am. Ured. *2512.*

150. **Hemileia vastatrix.**

This species does not now occur in North America, and may never have occurred. The reported occurrence in Costa Rica has been shown to be founded upon an error, and that for Porto Rico can not be verified.

150. **TRANZSCHELIA.**

Insert the synonym: *Lysospora* Arth. Résult. Sci. Congr. Bot. Vienne 340. 1906.

150. **Tranzschelia cohaesa.**

Add the host: *Anemone sphenophylla* Poepp., Texas.
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 31, f. 424.*
Add the exsiccati: Barth. N. Am. Ured. *282, 1381, 1382.*

151. **Tranzschelia punctata.**

Add the synonyms: *Micropuccinia Pruni* Rostr. Plantep. Haandb. 267. 1902. *Lysospora singularis* Arth. Résult. Sci. Congr. Bot. Vienne 340. 1906. Not *Puccinia singularis* Magn. 1890. *Aecidiolum punctatum* D. Sacc. Myc. Ital. *1449.* 1905. *Uredo Persicae* Speg. Revista Mus. La Plata **15**: 9. 1908. *Tranzschelia Pruni-spinosae* Dietel, Ann. Myc. **20**: 31. 1922.

In the list of hosts under Ranunculaceae, make " *Thalictrum purpurascens* " a synonym for *T. polygamum* Muhl., and add:

Anemone sp. (cult.), California.
Ranunculus recurvatus Poir., British Columbia.
Thalictrum dasycarpum Fisch. & Lall., North Dakota.

Add the following hosts, under Amygdalaceae:

Prunus angustifolia Marsh. (*P. Chicasa* Michx.), Alabama, South Carolina, Texas.
Prunus Avium L., New York.
Prunus cerasifera Ehrh., Florida.
Prunus cuneata Raf., Wisconsin.
Prunus mexicana Sudw., Texas.
Prunus orthosepala Koehne, Kansas.
Prunus Simonii Carr., Mississippi.
Prunus subcordata Benth., Calfornia.
Prunus triflora Roxb. (*P. japonica* auth. not Thunb.), Mississippi.
Prunus sp., Michigan, North Carolina, Oklahoma, Tennessee.

Add the illustrations: Corda, Ic. Fung. **3**: *pl. 5, f. 68;* Briosi & Cavara, Funghi Paras. *6:* Jahrb. Nass. Ver. Nat. **23–24**: *pl. 2, f. 13;* Grove, Brit. Rust Fungi *f. 155, 156;* McAlpine, Rusts Austr. *pl. D, f. 19, 20; pl. 10, f. 83–86.*

Add the exsiccati: Barth. Fungi Columb. *2592, 2887, 2888, 3391, 3490, 3884, 3986, 3987, 3988, 4489, 4690;* Barth. N. Am. Ured. *81, 82, 182, 283, 379, 380, 485, 583, 678, 878, 1088, 1184, 1185, 1186, 1681, 2085, 2180, 2181, 2284, 2382, 2690, 2691, 2979;* Brenckle, Fungi Dak. *518;* Ellis, N. Am. Fungi *225;* Ellis & Ev. N. Am. Fungi *1869a, 2403;* Kellerm. & Swingle, Kans. Fungi *828;* Rav. Fungi Car. **2**: 95; Seym. & Earle, Econ. Fungi *17, 18, 19, 20, 21, 22a, 22b, 204, 205;* Sydow, Ured. *1397;* Thüm. Myc. Univ. *2239.*

152. Insert:

9a. LIPOSPORA Arth. Bull. Torrey Club **48**: 36. 1921.

Cycle of development includes pycnia, aecia, and telia; autoecious. Pycnia subcuticular, other sori subepidermal.

Pycnia hemispheric or conic; hymenium flat.

Aecia erumpent, cylindric. Peridium splitting into a few recurved sections. Aeciospores globoid; wall colored or colorless, finely verrucose.

Telia erumpent, pulverulent, without peridium. Teliospores clustered by short pedicels to a common stalk, which is inconspicuous, two-celled by transverse septum, the cells usually rounded, but not readily falling apart; wall colored, verrucose.

Type species, *Lipospora tucsonensis* Arth. (on *Anemone sphenophylla*).

1. **Lipospora tucsonensis** Arth. Bull. Torrey Club **48**: 36. 1921.

Tranzschelia tucsonensis Dietel, Ann. Myc. **20**: 31. 1922.

O. Pycnia chiefly epiphyllous, scattered over large areas, preceding or accompanying the aecia, hemispheric or conic, conspicuous, chocolate-brown, large, 140–160 μ in diameter, 40–100 μ high; ostiolar filaments wanting.

I. Aecia hypophyllous, thickly scattered over large areas, short-cylindric, large, 0.4–0.6 mm. in diameter; peridium ample, divided into few (often 4) widely spreading recurved lobes, white; peridial cells in face view angularly ellipsoid, 20–30 by 28–34 μ, abutted or somewhat overlapping, the outer wall smooth, the inner wall evenly verrucose; aeciospores globoid, 16–20 by 18–22 μ; wall colorless or pale golden-yellow, moderately thin, 1–1.5 μ, closely and minutely verrucose.

III. Telia chiefly hypophyllous, accompanying the aecia, gregarious in irregular groups and somewhat confluent or scattered, large and irregular, 1–2 mm. across, dark chocolate-brown, pulverulent, the membranous epidermis soon ruptured but usually partly remaining and conspicuous; teliospores oblong, 18–24 by 32–38 μ, rounded above, rounded or paler and more or less narrowed below, considerably constricted but usually not separating at septum, the two cells of same size and shape or the lower one smaller and narrower; wall dark chestnut-brown or paler in lower cell, uniformly thin, 1–2 μ thick, closely and evenly verrucose; pedicel colorless, short, rarely longer than lower cell, fragile; mesospores not uncommon.

ON RANUNCULACEAE:
Anemone tuberosa Rydb. (*A. sphenophylla* Britton, not Poepp.), Arizona.
TYPE LOCALITY: Tucson Hills, Arizona, on *Anemone sphenophylla*.
DISTRIBUTION: Known only from the type locality.

152. **POLYTHELIS.**

Insert the synonym: *Puccinia* Pers. Obs. Myc. 24. 1796. Not *Puccinia* Willd. 1784, nor Pers. 1794.

Omit the first line in the key, and substitute *suffusca* for *Pulsatillae* in the fifth line.

152. **Polythelis retecta.**

Becomes a synonym of **Micropuccinia retecta** (about page 798).

152. **Polythelis fusca.**

Add the synonyms: *Dicaeoma Anemones* S. F. Gray, Nat. Arr. Brit. Pl. **1**: 542. 1921. *Puccinia aspera* Bon. Abh. Nat. Ges. Halle **5**: 220. 1860. *Puccinia fusca* Wint., in Rabh. Krypt.-Fl. **1**: 199. 1881. *Micropuccinia fusca* Rostr. Plantep. Haandb. 268. 1902. *Tranzschelia fusca* Dietel, Ann. Myc. **20**: 31. 1922.

Add the hosts:

Anemone oregana A. Gray, Oregon.
Anemone parviflora Michx., Idaho.
Anemone Piperi Britton, Idaho.

Add the illustration: Grove, Brit. Rust Fungi *f. 164.*

Add the exsiccati: Barth. Fungi Columb. *3648, 3925;* Barth. N. Am. Ured. *14, 219, 1825.*

153. **Polythelis Pulsatillae.**

Reduce this name to synonymy, and substitute: **Polythelis suffusca** (Holway) Arth. Bull. Torrey Club **48**: 34. 1921.

Add the synonym: *Tranzschelia Pulsatillae* Dietel, Ann. Myc. **20**: 31. 1922.

Add the exsiccati: Brenckle, Fungi Dak. *129.*

153. **Polythelis Thalictri.**

Add the synonym: *Tranzschelia Thalictri* Dietel, Ann. Myc. **20**: 31. 1922.

In the list of hosts make "*Thalictrum pupurascens*" a synonym of *T. polygamum*, and add:

Thalictrum dasycarpum Fisch. & Lall., Michigan, Vermont.
Thalictrum megacarpum Torr., Montana.
Thalictrum occidentalis A. Gray, Idaho, Nevada, Wyoming.
Thalictrum Wrightii A. Gray, New Mexico.

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 67d;* Grove, Brit. Rust Fungi *f. 163.*

Add the exsiccati: Barth. Fungi Columb. *3926;* Barth. N. Am. Ured. *117, 523, 2221, 2733, 3220;* Brenckle, Fungi Dak. *317;* Garrett, Fungi Utah. *113;* Thaxter, Rel. Farl. *274.*

154. **Phragmopyxis deglubens.**

Add the host: *Benthamantha cinerea* (L.) Kuntze (*Cracca cinerea* Morong), Guatemala.

154. Insert:

11a. TRICELLA Long, Mycologia **4**: 282. 1912.

Cycle of development includes pycnia and telia. Pycnia subcuticular and telia subepidermal.

Pycnia conoidal, usually with ostiolar filaments.

Telia erumpent, without paraphyses. Teliospores free, three-celled by transverse septa; wall verrucose, laminate, inner layer firm, colored, outer layer gelatinous, translucent, overlaid by cuticle; more than one pore in each cell and lateral.

Type species, *Tricella acuminata* Long (on *Coursetia glandulosa*).

1. **Tricella acuminata** Long, Mycologia **4**: 282. 1912.

O. Pycnia amphigenous, crowded in groups 0.1–0.8 mm. across on larger pale spots, yellowish becoming brown, subcuticular, conoidal or short-columnar, 70–75 μ in diameter by 50–70 μ high; ostiolar filaments hyaline, 25–35 μ long.

III. Telia amphigenous, at first thickly surrounding the pycnia, often confluent in areas 0.5–4 mm. across, soon naked, blackish-brown, pulverulent, ruptured epidermis delicate and usually inconspicuous; teliospores ellipsoid or elliptic-ovoid, 25–40 by 50–75 μ, strongly acuminate above, rounded below, not constricted at septa; wall laminate, the inner layer dark-brown, 3–4 μ thick, the pores 3 or 4 in each cell, lateral, the outer layer gelatinous, pale amber-color or nearly colorless, 4–7 μ thick, sparsely and evenly verrucose; pedicel 40–55 μ long, the third of the length next the spore thick-walled, 3–5 μ, pale golden-brown, the remaining two-thirds colorless, bulbous, very hygroscopic, swelling in water to globular and usually bursting.

ON FABACEAE:
Coursetia glandulosa A. Gray, Arizona.
TYPE LOCALITY: Sabina Canyon, Santa Catalina Mountains, Arizona.
DISTRIBUTION: Southern Arizona.

155. In the key.

Substitute for the third line:

Pores in two zones; paraphyses uncertain.	
Teliospores minutely verrucose.	2. *U. texana.*
Teliospores striate.	2a. *U. Wootoniana.*
Teliospores coarsely verrucose.	2b. *U. Agrimoniae.*

155. **Uopyxis sanguinea.**

Add the hosts:

Berberis atrocarpa Schneid., Oregon.
Mahonia dictyota (Jepson) Fedde (*Berberis dictyota* Jepson, *Odostemon dictyota* Abrams), California.

Add the exsiccati: Barth. Fungi Columb. *2770;* Barth. N. Am. Ured. *100, 1300, 1400, 1800, 1900, 2000, 2100, 2900, 3200;* Clements, Crypt. Form. Colo. *572.*

155. **Uropyxis texana.**

Add: EXSICCATI: Barth. Fungi Columb. *2599;* Barth. N. Am. Ured. *600.*

156. Insert:

2a. **Uropyxis Wootoniana** Arth. Bull. Torrey Club **42**: 585. 1915.

O. Pycnia unknown.

II. Uredinia hypophyllous, numerous, scattered, round or oblong, 0.5–1 mm. long, early naked, somewhat pulverulent, light cinnamon-brown; paraphyses wanting; urediniospores terete-fusiform or ovate-fusiform, 13–19 by 35–45 μ; wall pale-yellow or colorless, 2–4 μ thick, thicker above, 5–9 μ with hyaline umbo, finely and closely verrucose, the pores 8–12, in two zones of 4–6 pores each, equidistant from the equator.

III. Telia hypophyllous, similar to the uredinia, chocolate-brown; teliospores broadly ellipsoid, 19–23 by 23–27 μ, rounded above and below, moderately constricted at septum; wall chestnut-brown, 3–5 μ thick, with longitudinal ridge-like striations, the pores lateral, indistinct; pedicel colorless, terete, 3–5 μ thick, 145–165 μ long, solid except at base.

On Berberidaceae:
Mahonia Fremontii (Torr.) Fedde (*Berberis Fremontii* Torr., *Odostemon Fremontii* Rydb.), Arizona.
Mahonia haematocarpa (Wooton) Fedde (*Berberis haematocarpa* Wooton, *Odostemon haematocarpa* A. Heller), Arizona, New Mexico.
Type locality: Filmore Canyon, Organ Mountains, New Mexico, on *Berberis haematocarpa*.
Distribution: Southern Arizona and New Mexico.

2b. **Uropyxis Agrimoniae** Arth. Bull. Torrey Club **37**: 575. 1910.

O. Pycnia unknown.

II. Uredinia hypophyllous; urediniospores broadly ellipsoid or obovoid, 13–15 by 18–21 μ; wall golden-yellow, rather thin, 1.5 μ, evenly echinulate-verrucose, the pores 8 in two zones of 4 pores each, equidistant from equator.

III. Telia hypophyllous, scattered, soon naked, dark chocolate-brown, pulverulent, ruptured epidermis inconspicuous; teliospores ellipsoid, 18–21 by 25–27 μ, rounded at both ends, slightly constricted at septum; wall obscurely laminate, gelatinous layer rarely swelling slightly in water, inner layer chocolate-brown, rather thick, 1.5–2 μ, slightly thicker above, 3 μ, closely and evenly verrucose, the pores lateral, or one of those in upper cell in the umbo, usually indistinct; pedicel often inserted obliquely, colorless, firm, slender, terete, acuminate and roughened below, not swelling in water, 2–4 times length of spore.

On Rosaceae:
Agrimonia mollis (T. & G.) Britton, Missouri.
Type locality: Sumner, Missouri, on *Agrimonia mollis*.
Distribution: Known only from the type locality.

156. **Uropyxis Nissoliae.**
Add the host: *Nissolia fruticosa* Jacq., Salvador.
Add the exsiccati: Barth. N. Am. Ured. *1299*.

156. **Uropyxis Petalostemonis.**
Add the hosts:

Petalostemon compactus (Spreng.) Swezey, South Dakota.
Petalostemon oligophyllus (Torr.) Rydb., Montana, New Mexico, Wyoming.

Add the exsiccati: Barth. Fungi Columb. *4699*, *4896;* Barth. N. Am. Ured. *400*, *900*, *1200*, *1799*, *2898*, *2899*, *3300;* Brenckle, Fungi Dak. *89;* Clements, Crypt. Form. Colo. *583*.

157. **Uropyxis Daleae.**
Add the hosts:

Parosela diffusa (Moric.) Rose, Guatemala.
Parosela domingensis (DC.) Millsp., Guatemala.
Parosela nutans (Cav.) Rose, Guatemala; Salvador.

Add the exsiccati: Barth. N. Am. Ured. *1298;* Vesterg. Micr. Rar. Sel. *1508*.

158. **Uropyxis Amorphae.**

Add the synonym: *Aecidium Amorphae* Cooke, Grevillea **6**: 137. 1878.

Among the hosts: omit New Mexico as a locality under *Amorpha angustifolia* and place it under *A. californica;* reduce *A. laevigata* to synonymy under *A. californica.*

Add the hosts:

Amorpha montana Boynton, South Carolina.
Amorpha occidentalis Abrams, Arizona.

Add the exsiccati: Barth. Fungi Columb. *2496, 2698, 3598, 3997, 4097;* Barth. N. Am. Ured. *99, 200, 1399, 1500, 2300, 2400, 2600, 2896, 2897, 3198, 3199, 3298, 3299;* Brenckle, Fungi Dak. *88, 192, 192a, 248;* Ellis & Ev. Fungi Columb. *1691;* D. Griff. West Am. Fungi *25;* Sydow, Ured. *2509.*

159. **CALLIOSPORA.**

Substitute for the last line of the key:

Pedicel swelling slightly, mostly deciduous.
Teliospores 29–42 μ long, the walls cinnamon-brown. 3. *C. Farlowii.*
Teliospores 35–45 μ long, the walls chestnut-brown. 4. *C. Petalostemonis.*

159. **Calliospora Diphysae.**

In the description of the species: omit the word " smooth " as applied to the pycnia; the size of the teliospores should read " 23–33 by 35–50 μ "; after the thickness of the inner layer of the teliospores insert " sometimes cinnamon-brown, 1.5–3 μ thick "; after the thickness of the outer layer of the teliospores insert " in light-colored spores 1–2 μ thick in water."

Add the host: *Diphysa robinioides* Benth., Guatemala; Costa Rica.

The distribution should read: Mexico and Central America.

Add: EXSICCATI: Barth. N. Am. Ured. *208.*

159. **Calliospora Holwayi.**

In the description of the species: after the thickness of the inner layer of the teliospores insert " sometimes cinnamon-brown, 1.5–3 μ thick "; after the thickness of the outer layer of the teliospores insert " in light-colored spores scarcely swelling in water."

Make the two host-names synonyms of *Eysenhardtia polystachya* (Ortega) Sarg.

Add the host: *Eysenhardtia adenostylis* Baillon, Guatemala.

Add: EXSICCATI: Barth. N. Am. Ured. *2.*

160. Insert:

4.) **Calliospora Petalostemonis** Arth. Bull. Torrey Club **34**: 588. 1908.

O. Pycnia chiefly hypophyllous, numerous, scattered, conspicuous, golden-yellow becoming brown, subcuticular, conic, 80–110 μ in diameter, about half as high; ostiolar filaments 30–50 μ long.

III. Telia hypophyllous, scattered, small, roundish, 0.3–0.6 mm. across, chocolate-brown, somewhat pulverulent, ruptured epidermis barely noticeable; teliospores ellipsoid, 23–29 by 35–45 μ, rounded at both ends, slightly or not constricted at septum; wall laminate, the inner layer light chestnut-brown, medium thick, 2–2.5 μ, the two pores in each cell lateral and opposite, the outer layer gelatinous, pale-yellow, rather thin, 1–1.5 μ thick, very finely and rather sparsely verrucose; pedicel colorless, about 6 μ in diameter, short and largely deciduous, not swelling in water.

ON FABACEAE:
Petalostemon oligophyllus (Torr.) Rydb., New Mexico.
TYPE LOCALITY: Pecos, New Mexico, on *Petalostemon oligophyllus.*
DISTRIBUTION: Known only from the type locality.

160. Insert:

13a. HAPLOPYXIS Sydow, Ann. Myc. **17**: 105. 1919.

Cycle of development includes pycnia, uredinia, and telia. Pycnia not seen, but probably subcuticular, other sori subepidermal.

Uredinia erumpent, definite, without paraphyses. Urediniospores borne singly on pedicels; wall colored, echinulate, pores scattered.

Telia erumpent, definite. Teliospores free, one-celled, sparsely verrucose; wall laminate, inner layer firm, colored, outer layer gelatinous, translucent, overlaid by cuticle, the pores two, lateral.

Type species, *Uropyxis Crotalariae* Arth. (on *Crotalaria* sp.).

1. **Haplopyxis Crotalariae** (Arth.) Sydow, Ann. Myc. **17**: 105. 1919.

Uropyxis Crotalariae Arth. Am. Jour. Bot. **5**: 429. 1918.

O. Pycnia unknown.

II. Uredinia amphigenous, oblong or irregular, large, 0.5–1 mm. long, soon naked, pulverulent, cinnamon-brown, ruptured epidermis somewhat overarching and conspicuous; urediniospores ellipsoid or globoid, 18–26 by 23–30 μ; wall golden-brown to light-yellow, 2–2.5 μ thick, moderately echinulate, the pores 6–8, scattered.

III. Telia chiefly epiphyllous, like the uredinia but smaller, 0.1–0.2 mm. across; teliospores globoid, 26–30 μ in diameter; wall laminate, inner layer firm, dark chestnut-brown, 2–2.5 μ thick, the pores 2, lateral and opposite, outer layer gelatinous, yellow, swelling in water 5–6.5 μ thick, the cuticle sparsely verrucose; pedicel short, colorless, largely evanescent.

ON FABACEAE:
Crotalaria longirostrata H. & A., Guatemala.
Crotalaria vitellina Ker, Guatemala.
TYPE LOCALITY: Laguna, Lake Amatitlan, Department of Amatitlan, Guatemala, on *Crotalaria* [*vitellina*].
DISTRIBUTION: South-central Guatemala.

160. **PROSPODIUM.**

Substitute, for the key, that in the footnote on page 161.

160. **Prospodium appendiculatum.**

Add the synonyms: *Uredo cuticulosa* Ellis & Ev. Bull. Lab. Nat. Hist. Iowa **4**: 67. 1896. *Puccinia maligna* Dietel, Ann. Myc. **12**: 84. 1914. *Puccinia cuticulosa* Arth. Mycologia **9**: 83. 1917.

Replace the first line of the description by the following:

O. Pycnia amphigenous and fructicolous, gregarious on yellow spots 1.5–3.5 mm. in diameter, conspicuous, subcuticular, light chestnut-brown, broadly conic, 67–135 μ broad, 39–51 μ high.

Begin the next paragraph thus:

II. Uredinia of the primary sort amphigenous and fructicolous, grouped around the pycnia over areas 0.2–0.8 mm. long; urediniospores broadly obovate or globoid, 23–26 by 27–37 μ, gelatinous layer of the wall swelling up to 7 μ thick, otherwise like the secondary uredinia; uredinia of the secondary sort chiefly hypophyllous, etc.

Add: EXSICCATI: Barth. Fungi Columb. *3649;* Barth. N. Am. Ured. *220, 724;* Ellis & Ev. Fungi Columb. *2051;* Sydow, Ured. *1864.*

160. **Prospodium Amphilophii.**

Add the hosts:

Pithecoctenium echinatum (Aubl.) K. Schum., Cuba.
Pithecoctenium muricatum DC., Costa Rica.

161. **Prospodium tuberculatum.**

Add the host: *Lantana Camara* L., Morelos; Cuba.

Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 54, f. 177.* EXSICCATI: Barth. N. Am. Ured. *473, 474, 615.*

161. **Prospodium Lippiae.**

Add the hosts:

Lippia asperifolia Rich., Guatemala.
Lippia dulcis Trev., Cuba.
Lippia strigosa Turcz., Guatemala.
Lippia umbellata Cav., Guatemala.

Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 54, f. 179.* EXSICCATI: Barth. N. Am. Ured. *1187.*

162. **Prospodium plagiopus.**

Add the host: *Tecoma pentaphylla* (L.) Juss., Cuba; Porto Rico.

163. **Nephlyctis transformans.**

Add the exsiccati: Barth. Fungi Columb. *4568;* Barth. N. Am. Ured. *1123.*

163. **Nephlyctis conjuncta.**

Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 54, f. 180.* EXSICCATI: Barth. N. Am. Ured. *1316.*

164. **Phragmidium Peckianum.**

Add the host: *Oreobatus rubicundus* Wooton & Standley, New Mexico.
Add the exsiccati: Barth. N. Am. Ured. *520, 1625, 2527.*

165. **Phragmidium imitans.**

Add the hosts:

Rubus arizonicus (Greene) Rydb., New Mexico.
Rubus melanolasius Focke, Colorado.
Rubus neglectus Peck (cult.), Oregon.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 6, f. 66.*
Add the exsiccati: Barth. Fungi Columb. *4445, 4554;* Barth. N. Am. Ured. *518, 1124, 1214, 1420, 1622, 2525;* Brenckle, Fungi Dak. *360;* Vesterg. Micr. Rar. Sel. *1559.*

166. **Phragmidium occidentale.**

Add the host: *Oreobatus trilobus* (Seringe) Rydb. (*Rubus trilobus* Seringe), Guatemala.
Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 6, f. 65.*
Add the exsiccati: Barth. Fungi Columb. *4446, 4447;* Barth. N. Am. Ured. *519, 1421, 1513, 1624, 2125, 2526;* Garrett, Fungi Utah. *209;* Vesterg. Micr. Rar. Sel. *1560.*

167. **Phragmidium americanum.**

Add the exsiccati: Barth. Fungi Columb. *3919, 3920;* Barth. N. Am. Ured. *318, 807, 2216, 2729, 2730.*

167. **Phragmidium Rosae-setigerae.**

Add: EXSICCATI: Barth. N. Am. Ured. *1627, 3025;* Sydow, Ured. *2544.*

168. **Phragmidium Rosae-acicularis.**

Add the hosts:

Rosa Bourgeauiana Crépin, Montana.
Rosa hemisphaerica Herrm. (*R. sulphurea* Ait.), Alaska.
Rosa pisocarpa A. Gray, Idaho.
Rosa rugosa Thunb., Alaska.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 5, f. 51.*
Add the exsiccati: Barth. N. Am. Ured. *1018, 2639;* Brenckle, Fungi Dak. *7, 181.*

169. **Phragmidium montivagum.**

Add the hosts:

Rosa neomexicana Cockerell, Utah.
Rosa nutkana Presl, Idaho.
Rosa pulverulenta Rydb., Nevada, Utah.
Rosa sp., Arizona, New Mexico, North Dakota, Oregon, Washington; British Columbia, Manitoba.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 5, f. 57.*

Add the exsiccati: Barth. Fungi Columb. *3446, 3726, 3727, 3728, 3729, 3730, 3829, 4050, 4131, 4338, 4339, 4556, 4833;* Barth. N. Am. Ured. *319, 809, 917, 1017, 1319, 1623, 1732, 1733, 1734, 1821, 1924, 2025, 2637, 2638, 3122, 3218;* Brenckle, Fungi Dak. *203.*

170. **Phragmidium Rosae-californicae.**

Add the synonyms: *Caeoma Rosae-gymnocarpae* Dietel, Hedwigia **44**: 334. 1905. *Gymnoconia Rosae-gymnocarpae* Arth. N. Am. Flora **7**: 181. 1912. *Kunkelia Rosae-gymnocarpae* Arth. Bot. Gaz. **63**: 508. 1917.

Add the hosts:

Rosa chrysocarpa Rydb., Nevada.
Rosa pilifera Rydb., California.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 5, f. 58.*

Add the exsiccati: Barth. Fungi Columb. *4049, 4834;* Barth. N. Am. Ured. *723, 811, 919, 1019, 1320, 1423, 1626, 1735, 1823, 1926, 1927.*

170. **Phragmidium Rosae-arkansanae.**

Add the hosts:

Rosa blanda Ait., Missouri.
Rosa subnuda Lunell, North Dakota.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 5, f. 56.*

Add the exsiccati: Barth. Fungi Columb. *3644;* Barth. N. Am. Ured. *218, 412, 522, 722, 914, 918, 1014, 2126, 2219;* Brenckle, Fungi Dak. *152, 182, 285, 361;* Sydow, Ured. *2439.*

171. **Phragmidium disciflorum.**

Add the hosts:

Rosa damascena Mill., Nebsaska.
Rosa rugosa Thunb., Alaska.

Add the illustration: Grove, Brit. Rust Fungi *f. 222a–d.*

Add the exsiccati: Barth. Fungi Columb. *4944;* Barth. N. Am. Ured. *217, 915, 1922, 2218, 3120, 3121, 3215.*

172. **Phragmidium subcorticinum.**

Add the illustration: Grove, Brit. Rust Fungi *f. 222e.*

Add the exsiccati: Barth. Fungi Columb. *3643.*

173. **Phragmidium Andersoni.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 4, f. 47.*

Add the exsiccati: Barth. Fungi Columb. *2746, 3725;* Barth. N. Am. Ured. *808, 1419, 2124, 2217, 2523, 2524;* Brenckle, Fungi Dak. *408;* Garrett, Fungi Utah. *208;* Sydow, Ured. *2440.*

173. **Phragmidium Jonesii.**

Add: EXSICCATI: Garrett, Fungi Utah. *228.*

174. **Phragmidium Ivesiae.**

Add the hosts:

Horkelia tridentata Torr., California.
Potentilla Breweri S. Wats., California.
Potentilla coloradensis Rydb., Colorado.
Potentilla concinna Richards., Alberta.
Potentilla effusa Dougl., Colorado, Wyoming.
Potentilla gracilis Dougl., California; Alberta.
Potentilla Parishii Rydb., California.
Potentilla propinqua Rydb., Colorado.

Add the exsiccati: Barth. Fungi Columb. *3731, 4555;* Barth. N. Am. Ured. *721, 916, 1015, 1016, 1125, 1317, 1318, 1731, 1923, 2636, 3216, 3217.*

174. **Phragmidium Potentillae.**

Add the hosts:

Potentilla divisa Rydb., South Dakota.
Potentilla Hippiana Lehm., Saskatchewan.

Add the illustration: Grove, Brit. Rust Fungi *f. 220.*

Add the exsiccati: Barth. Fungi Columb. *3732, 4132, 4243;* Barth. N. Am. Ured. *521, 810, 1422, 1822, 1925, 2731, 2821;* Brenckle, Fungi Dak. *180, 180a;* D. Griff. West Am. Fungi *49.*

175. **Earlea speciosa.**

Add the exsiccati: Barth. Fungi Columb. *3620, 4818;* Barth. N. Am. Ured. *1712, 2513, 2514, 2911;* Brenckle, Fungi Dak. *53b;* Sydow, Fungi Exot. *113.*

177. **Earlea bilocularis.**

Add the hosts:

Potentilla Nuttallii Lehm., Washington.
Potentilla trina A. Nelson, Idaho.

Add: EXSICCATI: Barth. N. Am. Ured. *506, 1410.*

178. **Trachyspora Alchemillae.**

Add the illustration: Grove, Brit. Rust Fungi *f. 59.*

178. **Triphragmium Ulmariae.**

Add the illustrations: Grove, Brit. Rust Fungi *f. 218;* Fl. Ital. Crypt. Ured. *f. 85.*

179. **NYSSOPSORA.**

Add the synonym: *Triphragmium* § *Phaeotriphragmium* Milesi & Trav. Ann. Myc. **2**: 153. 1904.

179. **Nyssopsora echinata.**

Add the hosts:

Coleopleurum Gmelini (DC.) Ledeb., Alaska.
Ligusticum Leibergii Coult. & Rose, Idaho.

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 86;* Sydow, Monog. Ured. **3**: *pl. 7, f. 76;* E. & P. Nat. Pfl. 1^{1**}: *f. 47H;* Ann. Myc. **2**: *pl. 5, f. 6;* Ber. Deuts. Bot. Ges. **9**: *pl. 6, f. 7–14.*

Add the exsiccati: Barth. N. Am. Ured. *516, 1512, 2635.*

180. **Nyssopsora clavellosa.**

Insert: ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **9**: *pl. 6, f. 15–17;* Ann. Myc. **2**: *pl. 5, f. 7.*

Add the exsiccati: Barth. N. Am. Ured. *515;* Ellis & Ev. Fungi Columb. *177;* Thaxter, Rel. Farl. *281.*

180. Insert:

21a. SPHAEROPHRAGMIUM P. Magn. Ber. Deuts. Bot. Ges. **9**: 121. 1891.

Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal.

Uredinia erumpent, definite, usually encircled by paraphyses. Urediniospores borne singly on short pedicels, ellipsoid or obovoid, often angular; wall nearly or quite colorless, echinulate, the pores few, zonal.

Telia erumpent, definite, small, without paraphyses. Teliospores in globoid heads of 4–8 cells, with converging septa; wall colored, strongly echinate or appendaged, the pores indistinct; pedicels slightly or not colored.

Type species, *Triphragmium Acaciae* Cooke (on *Acacia* sp.).

1. **Sphaerophragmium Dalbergiae** Dietel, Hedwigia **32**: 30. 1893.

II. Uredinia hypophyllous, scattered, round, 0.2–0.5 mm. in diameter, sometimes grouped and confluent, tardily dehiscent, cinnamon-brown, ruptured epidermis prominent; paraphyses peripheral, hyphoid, rising slightly above the spores, about 9 μ in diameter, the wall yellowish, evenly thin; urediniospores obovate or angularly oblong, 13–20 by 24–37 μ; wall cinnamon-brown, uniformly thin, 1.5 μ, moderately echinulate, the pores 2, somewhat superequatorial.

III. Telia hypophyllous, similar to but smaller than the uredinia; teliospores globoid, 4–8-celled, 32–43 μ in diameter; wall dark-brown, each spore bearing a few upright projections, thickened above and with some of them expanded at the top into lateral stellate projections with the divisions recurved; pedicel nearly or quite colorless, about as long as the spore.

ON FABACEAE:
Dalbergia Amerimnum Benth., Cuba.
TYPE LOCALITY: Inanda, Natal, South Africa, on *Dalbergia armata*.
DISTRIBUTION: Cuba; also in Africa and India.

180. **GYMNOCONIA.**
Omit the key.

180. **Gymnoconia interstitialis.**
Omit the synonyms: *Aecidium nitens* Schw.; *Caeoma luminatum* Link.
Add the synonyms: *Uredo luminatum* Thüm. Bull. Soc. Nat. Mosc. **55**: 85. 1880. *Gymnoconia Peckiana* Trotter, Fl. Ital. Crypt. Ured. 337. 1910.
Change the host "*Rubus arcticus* L." to *R. acaulis* Michx.
Omit from the hosts: *Rubus cuneifolius* Pursh, *R. strigosus* Michx., *R. trivialis* Michx., *R. vermontanus* Blanch., *R. vitifolius* Cham. & Schlecht., and *R. villosus* Ait.; and add *R. neglectus* Peck, New York.
Omit from the localities under *Rubus allegheniensis*: Delaware, Iowa, Kansas, Kentucky, Missouri, South Dakota.
The distribution should read: Eastern Massachusetts to central Maryland and central Illinois, rare southward, common northward into Canada, and across the northern part of the continent from Prince Edward's Island to the Aleutian Islands; also in northern Europe and Asia.
Add the illustration: E. & P. Nat. Pfl. 1^{1**}: *f. 46A–C.*
Omit from the exsiccati: Kellerm. & Swingle, Kan. Fungi *31;* Ellis & Ev. Fungi Columb. *57, 1622;* Barth. Fungi Columb. *3238, 3239, 3327;* Rav. Fungi Am. *276;* Rav. Fungi Car. **1**: *91;* Rab.-Wint. Fungi Eur. *3225a;* Thüm. Myc. Univ. *446;* Sydow, Ured. *1389, 1785;* Seym. & Earle, Econ. Fungi *27, 28.*
Add the exsiccati: Barth. Fungi Columb. *3630, 3631, 3911, 4025;* Barth. N. Am. Ured. *1007, 1208, 1611;* Ellis, N. Am. Fungi *261;* Ellis & Ev. Fungi Columb. *346, 653;* Thaxter, Rel. Farl. *276a–c.*

181. **Gymnoconia Rosae-gymnocarpae.**
Becomes a synonym of **Phragmidium Rosae-californicae** (page 727).

182. **Xenodochus minor.**
Change the host-name to read: *Sanguisorba microcephala* Presl.

182. **Spirechina Loeseneriana.**
Add the host: *Rubus trichomallus* Schlecht., Costa Rica.

183. **Spirechina Arthuri.**
Replace the statement about pycnia, and one half of the description of uredinia, by:
O. Pycnia amphigenous, scattered on gall-like swelling of leaf 2–15 mm. in diameter, noticeable, subcuticular, golden- to chestnut-brown, discoid, 190–480 μ in diameter, 48–80 μ high; pycniospores ellipsoid, colorless, 3–4 μ long.

II. Uredinia of the primary form amphigenous, on galls surrounding the pycnia, crowded, becoming confluent and covering the gall; urediniospores 16–23 by 30–42 μ; wall about 1 μ thick, thickened above, 7–15 μ; uredinia of the secondary form hypophyllous, scattered, round, 0.1–0.2 mm. in diameter, pulverulent, yellow fading to white, ruptured epidermis inconspicuous; urediniospores 15–19 by 24–35 μ; wall 1–1.5 μ, not or somewhat thickened above, 3–8 μ; urediniospores of both forms ellipsoid, oblong, or fusiform-oblong, rounded or acute above, the wall colorless, marked with, etc.

Change the distribution to read: Guatemala.

183. **Spirechina Pittieriana.**

Change the distribution to read: Central America; also in South America.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 6, f. 100.*

184. **Spirechina Rubi.**

Add the hosts:

Rubus laxus Rydb., Guatemala.
Rubus Pringlei Rydb., Guatemala.
Rubus trichomallus Schlecht., Costa Rica.

Add: EXSICCATI: Barth. N. Am. Ured. *1098.*

184. **KUEHNEOLA.**

Insert the synonym: *Phragmidiella* P. Henn. Bot. Jahrb. **38**: 104. 1905.

Emend the generic description as follows: Urediniospores apparently without pedicels. Teliospores free or somewhat compacted, catenulate in chains of 4–12 cells, the chains apparently sessile.

Replace the key to species with the following:

Host belonging to family Rosaceae. 1 (3). *K. Uredinis.*
Host belonging to family Malvaceae. 2 (4). *K. malvicola.*

185. **Kuehneola obtusa** and **K. Duchesneae.**

Omit all pertaining to these two species, which are now placed under genus 25a, **Frommea** (page 731).

186. **Kuehneola Uredinis.**

Add the synonym: *Phragmidium Rubi corticicola* Kleb. Abh. Nat. Ver. Bremen **12**: 368. 1892.

Add the hosts:

Rubus frondosus Bigel., Delaware, Virginia.
Rubus Idaeus L., Pennsylvania.
Rubus lucidus Rydb., Florida.
Rubus occidentalis L., Michigan.
Rubus triflorus Richards., Massachusetts, Michigan, New York; Nova Scotia.
Rubus ursinus Cham. & Schlecht., California.

Add the exsiccati: Barth. Fungi Columb. *4934;* Barth. N. Am. Ured. *312, 609, 1914, 2209, 2323, 2516, 2621, 2723, 2724, 2725, 2813, 2814, 2915, 3115;* Rav. Fungi Am. *491;* Thaxter, Rel. Farl. *211a, b.*

Add the illustrations: Briosi & Cavara, Funghi Paras. *379;* Bot. Centr. **32**: *pl. 1, f. 10;* Ann. Rep. Conn. Exp. Sta. **1907**: *pl. 29, f. b, c;* Sydow, Monog. Ured. **3**: *pl. 13, f. 133;* Grove, Brit. Rust Fungi *f. 227.*

187. **Kuehneola malvicola.**

Add the synonym: *Rostrupia praelonga* Speg. Contr. Fl. Ventana 83. 1896.

Add the hosts:

Malache scabra B. Vogel (*Pavonia racemosa* Sw.), Porto Rico.
Malache speciosa (H.B.K.) Kuntze (*Pavonia speciosa* H.B.K.), Cuba.
Malvaviscus mollis DC., Guatemala.
Pavonia lasiopetala Scheele, Texas.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **3**: 320.

Add the exsiccati: Barth. Fungi Columb. *3193.*

187. **Kuehneola Gossypii.**

Becomes a synonym of **Cerotelium desmium** (page 698).

187. Insert:

25a. FROMMEA Arth. Bull. Torrey Club **44**: 503. 1917.

Cycle of development includes pycnia, primary and secondary uredinia, and telia, with indistinct alternating phases; autoecious. Pycnia subcuticular, other sori subepidermal.

Pycnia low, with flat hymenium; ostiolar filaments wanting.

Uredinia erumpent, mostly definite, with few or no paraphyses. Urediniospores borne singly on pedicels, globoid or obovoid; wall nearly or quite colorless, echinulately sculptured, the pores several, very indistinct.

Telia erumpent, usually definite, without paraphyses. Teliospores several-celled by transverse septa, rarely one-celled; wall not noticeably laminate, colored, smooth or sparingly verrucose above, the pores single and near apex in each cell; pedicels nearly or quite colorless, not hygroscopic.

Type species, *Uredo obtusa* Strauss (on *Tormentilla erecta*).

Primary uredinia conspicuously different from secondary form; paraphyses usually wanting. 1. *F. obtusa.*

Primary uredinia differing little from secondary form; paraphyses usually present. 2. *F. Duchesneae.*

1. **Frommea obtusa** (Strauss) Arth. Bull. Torrey Club **44**: 503. 1917.

Uredo obtusa Strauss, Ann. Wett. Ges. **2**: 107. 1810.

Omit from the synonymy as given on page 185: *Aregma obtusata* Fries; change the citation for *Phragmidium Tormentillae* Fuckel to read: Jahrb. Nass. Ver. Nat. **23–24**: 46. 1870; and add the synonyms: *Xenodochus Tormentillae* Magn. Ber. Deuts. Bot. Ges. **17**: 179. 1899. *Kuehneola obtusa* Arth. N. Am. Flora **7**: 185. 1912.

Description of the species, host, type locality, and distribution remain as given on page 185, under **Kuehneola obtusa.**

Add to the illustration as given on page 185: Ann. Wett. Ges. **2**: *pl. 11, f. 49;* Bot. Centr. **32**: *pl. 1, f. 1, 3–7;* Jahrb. Nass. Ver. Nat. **23–24**: *pl. 2, f. 51;* Sydow, Monog. Ured. **3**: *pl. 4, f. 48;* Grove, Brit. Rust Fungi *f. 228.*

Add to the exsiccati as given on page 185: Barth. Fungi Columb. *2879, 3634, 3912, 4124, 4933;* Barth. N. Am. Ured. *213, 313, 409, 715, 716, 1415, 2208, 2321, 2411, 2618, 2720, 2803;* Sydow, Ured. *2441, 2542.*

2. **Frommea Duchesneae** Arth. Bull. Torrey Club **44**: 504. 1917.

Kuehneola Duchesneae Arth. N. Am. Flora **7**: 185. 1912.

Description of the species, host, type locality, distribution, and exsiccati, as given on pages 185 and 186, under **Kuehneola Duchesneae.**

25b. KUNKELIA Arth. Bot. Gaz. **63**: 504. 1917.

Cycle of development includes subcuticular pycnia and subepidermal telia.

Pycnia conic or columnar; hymenium flat; ostiolar filaments wanting.

Telia caeomoid, erumpent, applanate, more or less indefinite, without peridium or paraphyses. Teliospores catenulate, globoid, one-celled; wall colorless or nearly so, verrucose, the pores several, scattered.

Type species, *Aecidium nitens* Schw. (on *Rubus "strigosus,"* now considered to be *R. Enslenii*).

1. **Kunkelia nitens** (Schw.) Arth. Bot. Gaz. **63**: 504. 1917.

Aecidium nitens Schw. Schr. Nat. Ges. Leipzig **1**: 69. 1822.
Caeoma luminatum Link, in Willd. Sp. Pl. **6**[2]: 61. 1825.
Aecidium (Caeoma) luminatum Schw. Trans. Am. Phil. Soc. II. **4**: 309. 1832.

O. Pycnia chiefly epiphyllous, scattered, noticeable, honey-yellow becoming brownish, columnar, projecting considerably above the surface of the epidermis, 87–100 μ high by 50–80 μ in diameter.

III. Telia closely resembling morphologically the aecia of *Gymnoconia interstitialis*, chiefly hypophyllous, from a perennial mycelium, causing some hypertrophy and dwarfing of the host, usually crowded and even confluent, occupying part or all of the under surface of the leaf-blades, applanate, irregular, 0.5–1.5 mm. across, soon naked, somewhat waxy, bright- usually reddish-orange when fresh, fading to pale-yellow, ruptured epidermis conspicuous; teliospores globoid or oblong, 15–23 by 17–28 μ; wall colorless, about 1.5 μ thick, evenly and finely verrucose, the pores obscure, 6–10, scattered.

ON ROSACEAE: (* indicates verification by germination.)

Rubacer parviflorum (Nutt.) Rydb. (*Rubus nutkanus* Moc., *R. parviflorus* Nutt.), California.*

Rubus aboriginum Rydb., Texas.

Rubus allegheniensis Porter (*R. nigrobaccus* L. H. Bailey, *R. villosus* Auth. not Ait.), Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Minnesota, Mississippi, Missouri, New Hampshire,* New York, North Carolina,* Ohio,* Oregon, Tennessee, Virginia,* West Virginia.*

Rubus Andrewsianus Blanch. (*R. argutus* Link), Massachusetts, New York, North Carolina.*

Rubus canadensis L. not A. Gray, Maine,* New York.*

Rubus carpinifolius Rydb., Texas.

Rubus cuneifolius Pursh, Alabama, Florida,* Maryland,* North Carolina, West Virginia.*

Rubus Enslenii Tratt., Georgia, North Carolina,* South Carolina.

Rubus floridus Tratt., Indiana.

Rubus frondosus Bigel., New York.

Rubus hispidus L., Georgia,* Maryland,* New York, Oklahoma.

Rubus lucidus Rydb., Florida, South Carolina.

Rubus macropetalus Dougl., British Columbia.

Rubus triflorus Richardson (*R. pubescens* Raf., *R. americanus* Britton), Virginia.*

Rubus trivialis Michx., Florida, Louisiana, North Carolina.*

Rubus ursinus Cham. & Schlecht., California.*

Rubus villosus Ait. (*R. canadensis* A. Gray, not L., *R. procumbens* Muhl., *R. subuniflorus* Rydb.). Connecticut, Delaware, District of Columbia, Georgia,* Indiana,* Maryland, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania.

Rubus vitifolius Cham. & Schlecht., California,* Oregon.

TYPE LOCALITY: Salem, North Carolina, on "*Rubus strigosus*," now considered to be *R. Enslenii*.

DISTRIBUTION: Central Florida and southern Texas northward to Maryland and central Illinois, still further north along the Atlantic coast to Massachusetts and in the prairie region of the Mississippi to South Dakota, and along the Pacific coast from southern California to British Columbia.

EXSICCATI: Barth. Fungi Columb. *3238, 3239, 3327, 3524, 4233, 4629, 4926;* Barth. N. Am. Ured. *211, 507, 605, 1113, 1411, 1504, 2118, 2324;* Ellis & Ev. Fungi Columb. *57, 1622;* Kellerm. & Swingle, Kan. Fungi *31;* Rav. Fungi Car. 1: *91;* Rav. Fungi Am. *276;* Rab.-Wint. Fungi Eur. *3225a;* Seym. & Earle, Econ. Fungi *27, 28;* Sydow, Ured. *1389, 1785;* Thüm. Myc. Univ. *446*.

25c. SKIERKA Racib. Par. Algen Pilze Javas 2: 30. 1900.

Cycle of development includes pycnia, uredinia, and telia. Pycnia and other sori subepidermal.

Pycnia discoidal; ostiolar filaments apparently wanting.

Uredinia opening by a pore in the epidermis, without peridia or paraphyses. Urediniospores borne singly on pedicels from a flat hymenium; wall colored, echinulate or verrucose, and more or less ridged, the pores indistinct.

Telia opening by a pore in the epidermis, without paraphyses. Teliospores one-celled, more or less fusiform, arising from an essentially flat hymenium, breaking from pedicel to show the hilum, and issuing from the ostiole in a mucilaginous filament; wall colorless or nearly so, smooth, the outer layer becoming mucilaginous, the pores one in each spore, apical, indistinct.

Type species, *Skierka Canarii* Racib. (on *Canarium commune*).

1. **Skierka Holwayi** Arth. Am. Jour. Bot. **5**: 433. 1918.

O. Pycnia amphigenous, solitary or few in small groups, noticeable, reddish-brown, discoidal, 416–448 μ in diameter by 96–128 μ high; ostiolar filaments apparently wanting.

II. Uredinia chiefly epiphyllous, in groups 1–5 mm. across, round, 0.1–0.2 mm. in diameter, covered by the greatly thickened epidermis, flask-shaped in cross-section, the dehiscence by a small pore, the spores extruded in filaments and for a time cohering, soon falling apart and giving the spots a pulverulent, cinnamon-brown appearance; urediniospores when dry or in alcohol oblong-fusiform or ellipsoid-fusiform, 19–26 by 43–60 μ, acuminate and beaked above; wall golden-brown, 2.5–3 μ thick, 7–9 μ above, very finely and inconspicuously verrucose, in water the outer layer paler, swelling up to 7–10 μ and 10–15 μ above, appearing smooth, the pores obscure, probably 2, equatorial.

III. Telia hypophyllous, opposite the uredinia and similar to them; teliospores oblong-fusiform, 12–19 by 35–50 μ exclusive of the acute or filiform beak, the narrowed base with a distinct hilum, cohering in columns 4–5 mm. long and 80–150 μ in diameter; wall colorless or slightly yellowish, smooth, the inner layer 1 μ thick, the outer layer not noticeable in alcohol or dry, swelling in water 3–9 μ and disintegrating, with the apex filiform, up to 100 μ, and likewise disintegrating; pedicel wholly deciduous, leaving a noticeable hilum.

ON SAPINDACEAE:
Thouinidium decandrum Radlk., Guatemala; Hondurus; Salvador.
TYPE LOCALITY: Agua Caliente, Dept. Guatemala, Guatemala, on *Thouinidium* sp.
DISTRIBUTION: Central America.

25d. CTENODERMA Sydow, Ann. Myc. **17**: 102. 1920.

Cycle of development includes pycnia and telia, both subepidermal.

Pycnia hemispheric or globoid, with ostiolar filaments.

Telia deep-seated within the tissues of the host, opening by a pore, without paraphyses. Teliospores one-celled, arising from a flat hymenium, breaking from pedicel to show the hilum; wall colorless, tuberculate and winged, the outer layer hygroscopic, becoming mucilaginous, the pores indistinct, but probably one and apical in each spore.

Type species, *Uredo cristata* Speg. (on *Sapindaceae*).

1. **Ctenoderma cristatum** (Speg.) Sydow, Ann. Myc. **17**: 102. 1920.

Uredo cristata Speg. Anal. Soc. Ci. Argent. **17**: 119. 1884.
Uromyces Cupaniae Arth. & Johnston, Mem. Torrey Club **17**: 131. 1918.

O. Pycnia amphigenous, thickly scattered among the telia over dark-colored, hypertrophied and bullate areas 2–8 mm. across, noticeable, dark-brown, globoid in section, 80–130 μ in diameter by 65–125 μ high; ostiolar filaments compact, 30–40 μ long.

III. Telia amphigenous, scattered over dark-colored bullate areas 2–8 mm. across, strongly punctate, deep-seated in the tissues of the host, opening by a pore; teliospores oblong-obovoid or fusiform, 16–29 by 40–58 μ, narrowed below, rounded or somewhat narrowed above, more or less winged; wall colorless or nearly so, tuberculate along the ridges, especially above, the inner layer 1–2 μ thick, the outer layer hygroscopic, swelling to 5–15 μ thick; pedicel wholly deciduous, leaving a noticeable hilum.

ON SAPINDACEAE:
Cupania macrophylla A. Rich., Cuba.
TYPE LOCALITY: Villa Rica, Paraguay, on *Sapindaceae* [now determined as *Cupania* sp.].
DISTRIBUTION: Western Cuba; also in South America.

25e. SPHENOSPORA Dietel, E. & P. Nat. Pfl. **1**^{1**}: 70. 1897.

Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal, but subepidermal pycnia may occur.

Uredinia erumpent, definite, without paraphyses. Urediniospores borne singly on pedicels; wall colored, echinulate, the pores indistinct.

Telia erumpent, somewhat indefinite, waxy. Teliospores two-celled, by a vertical

septum; wall colorless or nearly so, thin, smooth, the pores indistinct, but probably one in each cell and apical.

Type species, *Diorchidium pallidum* Wint. (on leaves of a climbing plant, now believed to be *Smilax* sp.).

1. **Sphenospora yurimaguasensis** (P. Henn.) H. S. Jackson, Mycologia **18**: 153. 1926.

Uredo yurimaguasensis P. Henn. Hedwigia **43**: 164. 1904.
Sphenospora smilacina Sydow, Ann. Myc. **23**: 318. 1925.

O. Pycnia unknown.

II. Uredinia chiefly hypophyllous, on effused yellowish spots, solitary or gregarious, often circinating about a central sorus, irregularly roundish or elongate, 0.2–0.5 mm. across, soon naked, often by a longitudinal rupture, somewhat pulvinate, golden-yellow or light cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or obovoid, 20–26 by 26–30 μ; wall cinnamon-brown, 1.5–2.5 μ thick, closely and strongly echinulate, the pores indistinct, 2, approximately equatorial.

III. Telia hypophyllous, crowded or confluent in groups 1.5–4 mm. across, often circinating about a uredinium, early naked, very waxy, reddish- or honey-yellow, ruptured epidermis noticeable; teliospores oblong-fusiform, 12–15 by 27–31 μ, obtuse or somewhat truncate above and below; wall nearly or quite colorless, uniformly thin, about 1 μ, smooth; pedicel colorless, once to once and a half length of spore.

ON SMILACEAE:
Smilax sp., Guatemala; Costa Rica.
TYPE LOCALITY: Yurimaguas, Peru, on *Smilax* sp.
DISTRIBUTION: Central America; also in South America.

25f. CHACONIA Juel, Bihang Sv. Vet.-Akad. Handl. **23**[10]: 12. 1897.

Cycle of development includes subepidermal telia, and possibly pycnia.

Telia erumpent, definite, pulvinate, without paraphyses; teliospores sessile, arising singly or in groups from a more or less enlarged cell of the hymenium, one-celled, oblong; wall colorless, thin, smooth, the pores obscure, but with germination from the apex.

Type species, *Chaconia alutacea* Juel (on *Calliandra* sp., error for *Pithecolobium divaricatum*).

1. **Chaconia** (?) **texensis** Arthur sp. nov.

O. Pycnia unknown, probably not formed.

III. Telia chiefly hypophyllous, gregarious or more or less scattered, prominent, round, 0.1–0.7 mm. in diameter, early naked, pulvinate, velvety or somewhat waxy, pale cinnamon-brown, ruptured epidermis inconspicuous; teliospores oblong or obovate-oblong, 13–20 by 40–80 μ, rounded or obtuse above and below; wall colorless, thin, about 1 μ, smooth.

ON LORANTHACEAE:
Phoradendron macrophyllum (Engelm.) Cockerell (*P. flavescens macrophyllum* Engelm.), Texas.

Type collected at Austin, Texas, on *Phoradendron macrophyllum*, May 8, 1901, *W. H. Long 947*.

25g. GYMNOTELIUM Sydow, Ann. Myc. **19**: 170. 1921.

Cycle of development includes pycnia, aecia, uredinia, and telia, with distinct alternating phases; heteroecious. Pycnia and other sori subepidermal.

Pycnia globoid or somewhat conoidal, honey-yellow becoming brownish, with ostiolar filaments.

Aecia erumpent, cupulate. Peridium colorless, dehiscent by apical rupture, the margins erose, erect or spreading; peridial cells more or less overlapping, the outer wall thick, smooth, the inner wall thinner, verrucose. Aeciospores globoid or broadly ellipsoid; wall colored, verrucose, with several moderately distinct pores.

Uredinia erumpent, definite, without peridium or paraphyses. Urediniospores borne singly on pedicels, globoid; wall colored, verrucose, the pores 2, equatorial.

Telia erumpent, definite. Teliospores 2-celled; wall colored, smooth, the pores one or two in each cell; pedicel hyaline, with thick walls.

Type species, *Uredo nootkatensis* Trel. (on *Chamaecyparis nootkatensis*).

1. **Gymnotelium nootkatense** (Trel.) Sydow, Ann. Myc. **19**: 170. 1921.

Uredo nootkatensis Trel. Harriman Alaska Exp. Crypt. 36. 1904.
Aecidium Sorbi Arth. Bull. Torrey Club **33**: 521. 1906.
Gymnosporangium Sorbi Kern, Bull. N. Y. Bot. Gard. **7**: 438. 1911.
Uredo Chamaecyparidis-nutkaensis Tubeuf, Nat. Zeits. Forst.-Landw. **2**: 91. 1914.
Gymnosporangium nootkatense Arth. Am. Jour. Bot. **3**: 44. 1915.

O and I. Pycnia and aecia as described at pages 190–191, under **Gymnosporangium Sorbi.**

On Malaceae:
Malus rivularis (Dougl.) Roem. (*Pyrus diversifolia* Dougl.), Alaska, Washington; British Columbia.
Pyrus betulaefolia Bunge, Alaska.
Sorbus occidentalis (S. Wats.) Greene, Alaska, Washington; British Columbia.
Sorbus sitchensis Roem., Alaska, Oregon, Washington.

II. Uredinia foliicolous, on yellow spots covering the whole leaf, round, 0.5 mm. in diameter, soon naked, bright-orange fading to pale-yellow, prominently pulvinate, somewhat pulverulent, ruptured epidermis generally noticeable; urediniospores globose or obovate-globoid, 28–32 μ in diameter; wall pale-yellow becoming colorless, moderately thick, 3–4 μ, finely and closely verrucose, appearing radiately striate, the pores 2, equatorial; pedicels colorless, somewhat persistent.

III. Telia not seen; teliospores in the uredinial sori usually 2-celled, sometimes 3- or 4-celled, ellipsoid, obovate-ellipsoid, or elongate-ellipsoid, 23–29 by 42–48 μ, rounded or narrowed above, narrowed below, slightly or not constricted at septum; wall pale lemon-yellow, uniformly thin, 1–1.5 μ, smooth, the pores one in each cell near the septum; pedicel colorless, evenly thick, 5–7 μ, once to twice length of spore.

On Juniperaceae:
Chamaecyparis nootkatensis (Lamb.) Spach, Alaska, Oregon, Washington.
Type locality: Hot Springs, Baranof Island, Alaska, on *Chamaecyparis nootkatensis.*
Distribution: Southeastern Alaska to northern Oregon.
Illustrations: Am. Jour. Bot. **3**: 42; Bull. N. Y. Bot. Gard. **7**: 438. *f. 3; pl. 152, f. 38;* Sydow, Monog. Ured. **3**: *pl. 1, f. 2.*
Exsiccati: Barth. N. Am. Ured. *1309, 1310.*

188. **GYMNOSPORANGIUM.**

Add the synonym: *Puccinia* Micheli; Adans. Fam. Pl. **2**: 8. 1763.

Conclude the first paragraph of the description with the words: or the telia subcuticular in some species.

188. In the key.

Omit the fourth line, the species being transferred to the genus *Gymnotelium*, and substitute:

Aeciospores large (24–34 μ), the wall thick (2–3 μ).	24.	*G. myricatum.*

Replace line 20 by:

Peridial cells spinulose.		
Aeciospores larger (22–31 μ), the wall cinnamon-brown.	7.	*G. exiguum.*
Aeciospores smaller (17–23 μ), the wall dingy-yellow.	21.	*G. Photiniae.*

189. In the aecial key.

Replace line 5 by:

Peridial cells densely rugose.	12.	*G. tubulatum.*
Peridial cells faintly and sparsely rugose.	10.	*G. Kernianum.*

Replace " 21. *G. japonicum* " by " 3a. *G. koreaense.*"

Replace " 22. *G. transformans* " by " 3. *G. transformans.*"

189. In the telial key.

Replace line 5 by:

Pedicels of teliospores terete.
Teliospore-wall uniform, 1.5–2 μ. 3. *G. transformans.*
Teliospore-wall thicker above, 3–5 μ. 3*a*. *G. koreaense.*

Insert after line 8 a coördinate line as follows:

Telia truncate or wedge-shaped, chestnut-brown. 5. *G. Harknessianum.*

For "24. *G. Ellisii*" read "24. *G. myricatum.*"

190. In the key.

Replace line 3 by:

Teliospores moderately small (42–55 μ).
Teliospores ellipsoid or oval (22–27 μ broad), the wall 2–3 μ thick. 19*a*. *G. Cupressi.*
Teliospores oblong-ellipsoid (16–22 μ broad), the wall 1–2 μ thick. 20. *G. effusum.*

For "24. *G. Ellisii*" read "24. *G. myricatum.*"

Replace line 14 by:

Telia thin, irregularly flattened, light chestnut-brown.
Teliospores ellipsoid (21–26 × 39–58 μ), the wall 1.5–2.5 μ thick. 12. *G. tubulosum.*
Teliospores narrowly ellipsoid (18–22 × 50–65 μ), the wall 1–1.5 μ thick. 28. *G. Nelsoni.*

190. **Gymnosporangium Blasdaleanum.**

Omit the third synonym: *Aecidium Pourthiaeae.*

Omit, under Malaceae, the fifth species, and add:

Choenomeles japonica (Thunb.) Lindl. (*Cydonia japonica* Pers., *Pyrus japonica* Thunb.), Oregon.
Cydonia vulgaris (L.) Pers. (*Pyrus vulgaris* L.), Oregon.
Malus baccata (L.) Desf. (*Pyrus baccata* L.), Oregon.
Malus ioensis (Wood) Britton (*Pyrus ioensis* L. H. Bailey), Oregon.
Malus Malus (L.) Britton (*Pyrus Malus* L.), Oregon.
Malus rivularis (Dougl.) Roemer (*Pyrus rivularis* Dougl., *P. diversifolia* Bong.), Oregon.
Pyrus communis L., Oregon.
Sorbus Aucuparia L., Oregon.
Sorbus hybrida L., Oregon.

Add the illustrations: Phytopathology **4**: *pl. 12;* Sydow, Monog. Ured. **3**: *pl. 1, f. 1.*

Add the exsiccati: Barth. N. Am. Ured. *2412, 3111.*

190. **Gymnosporangium Sorbi.**

Becomes a synonym of **Gymnotelium nootkatense** (page 735).

191. **Gymnosporangium fraternum.**

Reduce this name to synonymy, and substitute: **Gymnosporangium transformans** (as given on page 202).

Add the synonyms: *Roestelia transformans* Ellis; Peck, Bull. Torrey Club **5**: 3. 1874. *Gymnosporangium biseptatum foliicolum* Farl.; Ellis, N. Am. Fungi *1479*, hyponym. 1885. *Aecidium transformans* Paz.; Rab.-Paz. Fungi Eur. *4238*. 1901.

O and I. For description of pycnia and aecia see page 202, under *G. transformans.*

In the description of the teliospores the size should read "16–29 by 39–48 μ," and the description of the pores should be extended to read "or sometimes 1 in each cell, and apical."

Under type locality, change the host to read "*Pyrus arbutifolia.*"

Change the last word in the distribution from "New Jersey" to "Delaware."

Add the illustrations: Bull. N. Y. Bot. Gard. **7**: 463. *f. 25;* Bot. Gaz. **49**: *pl. 21, f. 7;* Sydow, Monog. Ured. **3**: *pl. 3, f. 28.*

Add the exsiccati: Ellis, N. Am. Fungi *1088;* Ellis & Ev. Fungi Columb. *1076;* Rab.-Paz. Fungi Eur. *4238;* Roum. Fungi Sel. *4533;* Seym. & Earle, Econ. Fungi *247, 247a;* Thaxter, Rel. Farl. *223a, c;* Thüm. Myc. Univ. *1029.*

191. Insert:

3a. **Gymnosporangium koreaense** (P. Henn.) H. S. Jackson, Jour. Agric. Res. **5**: 1006. 1916.

Roestelia koreaensis P. Henn. in Warb. Monsunia **1**: 5. 1899.
Tremella koreaensis Arth. Proc. Ind. Acad. **1900**: 136. 1901.
Gymnosporangium asiaticum Miyabe, Bot. Mag. Tokyo **17**: 34, hyponym. 1903.
Gymnosporangium Haraeanum Sydow, Ann. Myc. **10**: 405. 1912.
Gymnosporangium chinense Long, Jour. Agric. Res. **1**: 353. 1914.

O. Pycnia epiphyllous, on slightly discolored spots, in groups 1–3 mm. across, punctiform, orange-yellow becoming brownish; pycniospores small, fusiform.

I. Aecia hypophyllous, on somewhat thickened brownish spots, in crowded groups 1–7 mm. across, cylindric, slender, 0.2–0.4 mm. in diameter, 2–3 mm. high; peridium soon becoming irregularly lacerate and cancellate often to base, erect or somewhat spreading, often irregularly torn at the end; peridial cells seen in both face and side views broadly lanceolate, or in face view oval and in side view oblong, 23–35 by 60–90 μ, coarsely rugose on inner and side walls, the ridges much higher on side walls and extending entirely across, the outer wall 1.5–2 μ thick, the inner wall and side walls 5–7 μ thick; aeciospores globoid, 18–23 μ in diameter; wall pale cinnamon-brown, moderately thick, 1.5–2 μ, finely and closely verrucose, the pores several.

ON MALACEAE:
Pyrus sinensis Lindl. (*P. japonica* Auth. not Thunb.), California, Oregon.

III. Telia foliicolous, scattered or aggregate and sometimes confluent, causing only slight hypertrophy, pulvinate, 0.5–1 mm. across, forming reddish-brown, gelatinous masses, becoming dark-brown; teliospores 2-celled, ellipsoid, 16–23 by 35–50 μ, rounded or narrowed at both ends, slightly or not constricted at septum; wall pale cinnamon-brown, 1.5–2 μ thick, thinner and paler in spores near center of telium, the pores 2 in each cell near the septum, or sometimes one of the pores in the upper cell near apex, smooth; pedicel hyaline, cylindric, uniform, 3–5 μ in diameter, moderately long.

ON JUNIPERACEAE:
Juniperus chinensis L., Connecticut, Oregon, Washington.
TYPE LOCALITY: Korea, on *Pyrus* sp. [probably *P. sinensis*].
DISTRIBUTION: Sparingly sporadic on the Atlantic and Pacific coasts of the United States on plants cultivated for ornament; also in Japan and eastern Asia.
ILLUSTRATIONS: Bull. N. Y. Bot. Gard. **7**: 460. *f. 22*, exclusive of teliospore; Sydow, Monog. Ured. **3**: *pl. 1, f. 8;* Zeits. Pflanzenkr. **10**: *pl. 2;* Jour. Agric. Res. **5**: *pl. 78, 79.*

191. **Gymnosporangium inconspicuum.**

Among the hosts under Malaceae change "New Mexico" to "Utah" after *Amelanchier utahensis*, and add:

Amelanchier Bakeri Greene, Arizona, Colorado, New Mexico.
Amelanchier prunifolia Greene, Utah.
Peraphyllum ramosissimum Nutt., Colorado.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 1, f. 3.*

192. **Gymnosporangium Harknessianum.**

Substitute for "III. Telia unknown":

III. Telia foliicolous, from an annual mycelium, scattered, truncate or wedge-shaped, 1–1.5 mm. high, chestnut-brown; teliospores 2-celled, narrowly ellipsoid, 16–22 by 45–72 μ, rounded or somewhat narrowed both above and below, slightly or not constricted at septum; wall pale cinnamon-brown, rather thin, about 1.5 μ, uniform, the pores 2 in each cell, near the septum; pedicel hyaline, cylindric, 4–6 μ in diameter, long.

ON JUNIPERACEAE:
Juniperus occidentalis Hook., California, Oregon.

Change the distribution to read: Central Oregon to northern California.

193. **Gymnosporangium Davisii.**

Add the exsiccati: Thaxter, Rel. Farl. *223b.*

193. **Gymnosporangium juvenescens.**

Add the hosts, under Malaceae:

Amelanchier Bakeri Greene, Utah.
Amelanchier canadensis (L.) Medic. (*A. Botryapium* DC.), Wisconsin.
Amelanchier Jonesiana C. Schneid., Utah.
Amelanchier mormonica C. Schneid., Arizona, New Mexico.
Amelanchier spicata (Lam.) C. Koch, Wisconsin.

Add the host, under Juniperaceae: *Juniperus horizontalis* Moench (*J. prostrata* Pers., *Sabina horizontalis* Rydb.), Montana, North Dakota, Wisconsin, Wyoming; Saskatchewan.

Add the exsiccati: Barth. Fungi Columb. *4541, 4632, 4730;* Barth. N. Am. Ured. *1116, 1717, 1813, 2017, 2619, 3112, 3431;* Brenckle, Fungi Dak. *278, 359, 359a;* Ellis & Ev. Fungi Columb. *761;* and omit: Ellis & Ev. Fungi Columb. *1676.*

194. **Gymnosporangium Kernianum.**

Replace the first three lines under the name by:

O. Pycnia epiphyllous, in crowded groups 1–3 mm. across, on somewhat larger yellowish spots, punctiform, conspicuous, honey-yellow becoming brown, in section globoid, 50–70 μ in diameter; ostiolar filaments agglutinate, 30–45 μ long.

I. Aecia hypophyllous, gregarious, inconspicuous, few on slightly thickened spots 2–5 mm. across, cylindric, somewhat attenuate above, 2–2.5 mm. or more high, 0.2–0.4 mm. in diameter; peridium rupturing tardily at apex, becoming somewhat lacerate; peridial cells oblong in side view, 23–30 by 75–110 μ, considerably overlapping and articulate, the outer wall rather thin, 2–2.5 μ, smooth, the inner wall much thicker, 9–12 μ, faintly and sparsely rugose; aeciospores angularly globoid or short-oblong, 21–26 by 26–32 μ; wall cinnamon-brown, 2.5–3.5 μ thick, finely and inconspicuously verrucose, the pores prominent, 8–10, scattered.

ON MALACEAE:
Amelanchier alnifolia Nutt., Oregon.
Amelanchier oreophila A. Nelson, Arizona, Colorado.
Pyrus communis L., Arizona.

Add the hosts, under Juniperaceae:

Juniperus occidentalis Hook., California, Oregon.
Juniperus pachyphlaea Torr. (*Sabina pachyphlaea* Ant.), Arizona, New Mexico.

Change the distribution to read: New Mexico and Arizona northward to southern Idaho and eastern Oregon.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 1, f. 14.*

Add: EXSICCATI: Barth. N. Am. Ured. *1613, 1718.*

194. **Gymnosporangium trachysorum.**

Add the host, under Malaceae: *Crataegus monogyna* Jacq. (*C. Oxyacantha* Auth. not L.), Pennsylvania.

195. **Gymnosporangium tubulatum.**

Add the host, under Malaceae: *Crataegus chrysocarpa* Ashe (*C. sheridana* A. Nelson), Wyoming.

Replace the line pertaining to telia by:

III. Telia caulicolous, from a perennial mycelium, appearing on irregular globoid galls 2–10 mm. or more in diameter, mostly wedge-shaped, often irregular, comparatively thin, about 3–4 mm. high, often confluent at the bases, chestnut-brown; teliospores 2-celled, ellipsoid, 21–26 by 39–58 μ, usually narrowed both above and below, slightly or not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, smooth, the pores 2 in each cell, near the septum; pedicel hyaline, cylindric, uniform, 5–6 μ in diameter, very long.

ON JUNIPERACEAE:
Juniperus horizontalis Moench (*J. prostrata* Pers.), Wyoming.
Juniperus scopulorum Sarg. (*Sabina scopulorum* Rydb.), Idaho, Montana, Washington, Wyoming.

Change the distribution to read: Black Hills, South Dakota, westward to eastermost Washington and Oregon.

Add: ILLUSTRATION: Sydow, Monog. Ured. **3**: *pl. 2, f. 17.* EXSICCATI: Barth. Fungi Columb. *4423;* Barth. N. Am. Ured. *1614, 1615, 1719, 1720, 2019, 3113.*

195. **Gymnosporangium Botryapites.**

Insert, in the description of the telia, after the word caulicolous " or sometimes appearing foliicolous."

Add the illustrations: Sydow, Monog. Ured. **3**: *pl. 2, f. 18;* Zeits. Pflanzenkr. **5**: 416. *f. 216.*

Add the exsiccati: Barth. Fungi Columb. 4026; Thaxter, Rel. Farl. *219a, b.*

196. **Gymnosporangium Nidus-avis.**

In the description of the teliospores change the reading to: " teliospores 2-celled, ellipsoid, 16–23 by 39–55 μ, or oblong-ellipsoid, 13–18 by 37–58 μ"; and also: " the pores one in a cell, apical, or two in a cell, one apical and one near septum in upper cell, both near septum in lower cell."

Add the exsiccati: Barth. N. Am. Ured. *910;* Ellis, N. Am. Fungi *222;* Thaxter, Rel. Farl. *227a, b.*

197. **Gymnosporangium germinale.**

Add the synonym: *Aecidium Purpusiorum* P. Henn. Hedwigia Beibl. **42**: 189. 1903.

Add the hosts, under Malaceae:

Amelanchier alnifolia Nutt., Montana, Wyoming; British Columbia.
Amelanchier spicata (Lam.) C. Koch, Michigan.
Crataegus chrysocarpa Ashe (*C. sheridana* A. Nelson), Wyoming.
Crataegus coccinea L. (*C. modesta* Sarg.), Massachusetts, Mississippi, Pennsylvania.
Crataegus Douglasii Lindl. (*C. brevispina* Dougl.), Montana.
Crataegus Holmesiana Ashe (*C. tenuifolia* Britton), Maine, Massachusetts.
Crataegus mexicana Moc. & Sessé, Mexico (state).

Add the illustrations: Bull. Penn. Exp. Sta. 160: *f.* 9^B, *10;* Sydow, Monog. Ured, **3**: *pl. 2, f. 21;* Bull. Cornell Exp. Sta. 80: *f. 10, 11;* Ann. Rep. Conn. Exp. Sta. **31–32**: *pl. 20b;* Bull. Iowa Exp. Sta. 84: *f. 4, 5f;* Ann. Rep. N. J. Exp. Sta. **13**: 308, *f. 10,* 309, *f. 11;* Ann. Rep. N. Y. State Mus. **25**: *pl. 1, f. 10–12.*

Add the exsiccati: Barth. Fungi Columb. *4027, 4028;* Barth. N. Am. Ured. *805. 3419, 3420;* Thaxter, Rel. Farl. *221a–c.*

198. **Gymnosporangium cornutum.**

Add to the hosts, under Malaceae: *Sorbus sitchensis* Roem., Washington.

Add the exsiccati: Barth. Fungi Columb. *4928;* Barth. N. Am. Ured. *1412, 3417, 3418;* Thaxter, Rel. Farl. *225a, b.*

199. **Gymnosporangium exterum.**

Add the host, under Rosaceae: *Porteranthus trifoliatus* (L.) Britton (*Gillenia trifoliata* Moench, *Spiraea trifoliata* L.), Virginia.

199. **Gymnosporangium juniperinum.**

Add the illustrations: Centr. Bakt. **9**: *f. 1,* 3^{1-8}; Zeits. Pflanzenkr. **1**: 112. *f. 2;* 113. *f.* 3^{1-8}; Briosi & Cavara, Funghi Paras. *163;* Beitr. Krypt. Schweiz 1^1: 87; Fl. Ibér. Ured. **2**: *f. 90–92.*

Add: EXSICCATI: Barth. N. Am. Ured. *1413, 3430.*

200. **Gymnosporangium gracilens.**

Add the host, under Hydrangeaceae: *Fendlera falcata* Thornber, New Mexico.

Add: EXSICCATI: Barth. N. Am. Ured. *3422, 3423, 3424;* Garrett, Fungi Utah. *204.*

201. Insert:

19a. **Gymnosporangium Cupressi** Long & Goodding; Long, Bot. Gaz. **72**: 39. 1921.

O and I. Pycnia and aecia unknown.

III. Telia caulicolous, from a perennial mycelium, appearing on twigs, branches, and trunks, causing fusiform or globoid swellings 1–90 cm. long by 0.5–30 cm. thick, usually breaking forth irregularly and often transversely on the smaller branches and twigs, and in irregular rows in deep longitudinal fissures of the bark on the larger branches and trunks, more or less wedge-shaped, often irregular and somewhat crenate at top, before gelatinization 2–10 mm. broad by 4–6 mm. tall, dark chestnut-brown, becoming cinnamon-brown after expansion; teliospores 2-celled, oval or ellipsoid, 22–27 by 43–50 μ, rounded at each end, not or slightly constricted at septum; wall light cinnamon-brown, 2–3 μ thick, the pores 2 in each cell near the septum, smooth (some spores more slender, with thinner, paler walls); pedicel cylindric, colorless.

ON JUNIPERACEAE:
Cupressus arizonica Greene, Arizona.
TYPE LOCALITY: Snebly Hill, 3.5 miles from Sedona, Arizona, on *Cupressus arizonica*.
DISTRIBUTION: Central Arizona.

201. **Gymnosporangium effusum.**

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 2, f. 24.*

Add: EXSICCATI: Barth. N. Am. Ured. *1716.*

201. **Gymnosporangium japonicum.**

Reduce this name to synonymy, and substitute: **Gymnosporangium Photiniae** (P. Henn.) Kern, Bull. N. Y. Bot. Gard. **7**: 443. 1911.

Omit the two synonyms, which belong under *G. koreaensis.*

Add the synonyms: *Roestelia Photiniae* P. Henn. Hedwigia **33**: 231. 1894. *Aecidium Pourthiaeae* Sydow, Mém. Herb. Boiss. **4**: 3. 1900. *Roestelia Pourthiaeae* Miyabe, Bot. Mag. Tokyo **17**: 35. 1903. *Gymnosporangium spiniferum* Sydow, Ann. Myc. **10**:78. 1912.

Change the description of the pycnia from " numerous, crowded in roundish groups 1–3 mm. across " to " few, crowded in roundish groups 0.5–1.5 mm. across."

Change the description of the aecia to read as follows:

I. Aecia hypophyllous, gregarious, numerous, in crowded groups on thickened spots, cylindric, 0.2–0.4 mm. in diameter by 3–4 mm. high; peridium rupturing at apex, remaining tubular, becoming somewhat cancellate in upper part; peridial cells seen in both side and face views, oblong in side view, 23–29 by 61–93 μ, lanceolate in face view, 25–35 μ broad, the outer wall rather thin, 2–3 μ, the inner and side walls rather thick, 5–7 μ, densely and rather sharply subspinulose; aeciospores broadly ellipsoid or globoid, 17–18 by 19–23 μ; wall dingy yellow, moderately thick, 2.5–3.5 μ, evenly and moderately verrucose.

Change the host under Malaceae to read: *Photinia villosa* DC. (*P. laevis* DC., *Pourthiaea villosa* Decaisne) in Japan and eastern China; not recorded from America.

Change the type locality to read: Yokohama, Japan, on *Photinia laevis.*

Change the distribution to read: Sparingly sporadic on the Atlantic and Pacific coasts of the United States on plants cultivated for ornament; also in Japan and eastern China.

Change the illustrations to read: Zeits. Pflanzenkr. **10**: *pl. 1;* Bull. N. Y. Bot. Gard. **7**: 443. *f. 9;* 460. *f. 22*, exclusive of peridial cell.

202. **Gymnosporangium transformans.**

Omit all pertaining to this species, the data being incorporated with **Gymnosporangium fraternum** (page 736).

202. **Gymnosporangium clavariaeforme.**

Add the hosts, under Malaceae:

Amelanchier florida Lindl., Utah.
Pyrus communis L., South Carolina.

Add the illustrations: Sydow, Monog. Ured. **3**: *pl. 3, f. 29;* Centr. Bakt. **9**: *f. 2*, 3^{9-18}; Zeits. Pflanzenkr. **1**: 111. *f. 1*, 113, *f.* 3^{9-18}; Fl. Ital. Crypt. Ured. *f. 75;* E. & P. Nat. Pfl. 1^{1**}: *f. 31F, G;* Ber. Deuts. Bot. Ges. **12**: *pl. 5, f. 8;* Briosi & Cavara, Funghi Paras. *39;* Malpighi, Anat. Plant. (1675) *pl. 77;* Micheli, Nov. Pl. Gen. (1729) *pl. 92, f. 1A, C–F;* Fl. Ibér. Ured. **2**: *f. 85–87.*

Add the exsiccati: Barth. Fungi Columb. *4927;* Barth. N. Am. Ured. *1715, 3416;* Garrett, Fungi Utah. *203;* Rav. Fungi Car. **5**: *96;* Thaxter, Rel. Farl. *220a, b.*

203. **Gymnosporangium Ellisii.**

Reduce this name to synonymy, and substitute: **Gymnosporangium myricatum** (Schw.) Fromme, Mycologia **6**: 229. 1914.

Add the synonyms: *Caeoma* (*Aecidium*) *myricatum* Schw. Trans. Am. Phil. Soc. II. **4**: 294. 1832. *Aecidium myricatum* Schw. Trans. Am. Phil. Soc. II. **4**: 309. 1832.

Replace the line pertaining to pycnia and aecia by:

O. Pycnia epiphyllous, gregarious, in crowded circular groups 2–5 mm. in diameter, on blackened areas, orange-yellow, globose in vertical section, 140–190 μ in diameter; ostiolar filaments 30–80 μ long.

I. Aecia hypophyllous, fructicolous and caulicolous, in crowded groups, on discolored hypertrophied areas, cupulate, 0.2–0.3 mm. in diameter; peridium yellowish, fragile, becoming lacerate to the base, slightly recurved; peridial cells oblong, 26–29 by 32–39 μ, overlapping, the outer wall thick, 7–10 μ, smooth, transversely striate, the inner wall much thinner, 2–3 μ, closely and prominently verrucose; aeciospores globoid or oblong, 24–30 by 27–34 μ; wall pale-yellow or colorless, 2–3 μ thick, closely and strongly verrucose, the pores 6–8, scattered.

On Myricaceae:
Comptonia peregrina (L.) Coulter (*C. asplenifolia* Gaertn.), New Jersey.
Myrica caroliniensis Mill., Connecticut, Massachusetts, New Jersey.
Myrica cerifera L., Delaware, New Jersey, New York.

Change the type locality to read: New York, on *Myrica cerifera.*

Add the illustrations: E. & P. Nat. Pfl. 1^{1**}: *f. 31H, J;* Ber. Deuts. Bot. Ges. **17**: *pl. 12, f. 12–15;* Sydow, Monog. Ured. **3**: *pl. 3, f. 31.*

Add the exsiccati: Barth. Fungi Columb. *4001;* Ellis, N. Am. Fungi *230;* Ellis & Ev. Fungi Columb. *62;* Thaxter, Rel. Farl. *222;* Thüm. Myc. Univ. *1224.*

204. **Gymnosporangium Betheli.**

Add the host, under Juniperaceae: *Juniperus occidentalis* Hook., Oregon.

Add the illustration: Sydow, Monog. Ured. **3**: *pl. 3, f. 32.*

Add the exsiccati: Barth. Fungi Columb. *4630;* Barth. N. Am. Ured. *804, 1114, 1714, 2515, 3110, 3317;* Brenckle, Fungi Dak. *331, 980;* Garrett, Fungi Utah. *227.*

204. **Gymnosporangium globosum.**

Add the synonym: *Roestelia globosa* Thaxter; Seym. & Patt. in Deane, Fl. Metrop. Park Comm. 138. 1896.

Add the hosts, under Malaceae:

Crataegus leiophylla Sarg. (*C. Maineana* Sarg.), New York.
Crataegus macrosperma Ashe, New York.
Crataegus monogyna Jacq. (*C. Oxyacantha* Auth. not L.), Massachusetts.
Crataegus viridis L., Oklahoma.
Malus angustifolia (Ait.) Michx. (*Pyrus angustifolia* Ait.), South Carolina.
Malus glaucescens Rehder, Indiana.

Add the host, under Juniperaceae: *Juniperus horizontalis* Moench (*J. prostrata* Pers.), North Dakota.

Add the illustrations: Ann. Rep. Conn. Exp. Sta. **27**: *pl. 8, f. 2, pl. 11, f. c.*

Add the exsiccati: Barth. Fungi Columb. *4029*, *4929*, *5025;* Barth. N. Am. Ured. *408*, *508*, *606*, *1308*, *2322*, *2413*, *2913*, *3018*, *3421;* Brenckle, Fungi Dak. *332;* Ellis, N. Am. Fungi *1085a*, *c*, *d;* Thaxter, Rel. Farl. *224a–c;* Seym. & Earle, Econ. Fungi *230x*, in part; Sydow, Ured. *2437*.

207. **Gymnosporangium Nelsoni.**

Add the hosts, under Malaceae:

Amelanchier Bakeri Greene, Arizona, Colorado.
Amelanchier florida Lindl. (*A. elliptica* A. Nelson), Colorado, Nevada.
Amelanchier mormonica C. Schneid., Colorado, Utah.
Amelanchier utahensis Koehne, Colorado.
Crataegus chrysocarpa Ashe (*C. sheridana* A. Nelson), Wyoming.
Malus rivularis (Dougl.) Roem. (*Pyrus diversifolia* Dougl.), Washington; Alaska.
Sorbus scopulina Greene (*S. sambucifolia* A. Gray, not Cham. & Schlecht.), Montana, Wyoming.
Sorbus sitchensis Roem., Montana.

Add the hosts, under Juniperaceae:

Juniperus horizontalis Moench (*J. prostrata* Pers.), Montana, South Dakota.
Juniperus occidentalis Hook., Oregon.

Add the exsiccati: Barth. N. Am. Ured. *510*, *1117*, *1913*, *2018*, *2620*, *3212*, *3319*, *3433*, *3434*, *3435;* Brenckle, Fungi Dak. *332a;* Ellis & Ev. Fungi Columb. *1292*.

208. **Gymnosporangium corniculans.**

Add the host, under Malaceae: *Amelanchier alnifolia* Nutt., Saskatchewan.

Add the exsiccati: Barth. Fungi Columb. *1827*.

208. **Gymnosporangium floriforme.**

Add the exsiccati: Barth. N. Am. Ured. *2721*.

209. **Gymnosporangium Juniperi-virginianae.**

Add the host, under Juniperaceae: *Juniperus scopulorum* Sarg. (*Sabina scopulorum* Rydb.), Colorado, Nebraska.

Add the illustrations: Rep. Comm. Agr. U. S. **1888**: Veg. Path. *pl. 11*, *12;* Bull. Ala. Exp. Sta. 132: *pl. 2*, *f. 3*, *4;* Ann. Rep. Neb. Exp. Sta. **22**: Heald *pl. 1–9*.

Add the exsiccati: Barth. Fungi Columb. *3629*, *4540*, *4631*, *4823*, *5026;* Barth. N. Am. Ured. *212*, *310*, *509*, *607*, *608*, *1115*, *1612*, *3318;* Brenckle, Fungi Dak. *358;* Ellis, N. Am. Fungi *1086d;* Thaxter, Rel. Farl. *226;* Seym. & Earle, Econ. Fungi *226a*, *b*, *227b;* Sydow, Ured. *2438*.

211. **ERIOSPORANGIUM.**
217. **ARGOMYCES.**
219. **POLIOMA.**

Omit all pertaining to these genera, the species having been transferred to *Dicaeoma*, *Bullaria*, or *Micropuccinia*.

219. **NIGREDO.**

The last synonym should read: *Puccinella* Fuckel, Jahrb. Ver. Nat. Nass. **15**: 18. 1861.

Add the synonyms: *Nielsenia* Sydow, Ann. Myc. **19**: 171. 1921. *Ontotelium* Sydow, Ann. Myc. **19**: 174. 1921. *Capitularia* Sydow, Ann. Myc. **20**: 123. 1922.

220. In the aecial key.

Replace line 5 by:

Host belonging to family Euphorbiaceae. 69. *N. proëminens.*
Aeciospore-wall thin, 1 μ. 69*a*. *N. dictyosperma.*
Aeciospore-wall thicker, 1–2 μ.

In line 19, for "*Lilii*" read "*Holwayi.*"

Insert after line 19:

Host belonging to family Amaryllidaceae. 40*a*. *N. affinis.*

Insert after line 20:

Host belonging to family Loranthaceae.
Aeciospores ellipsoid (18–23 × 24–27 μ). 42*a*. *N. ornatipes.*
Aeciospores oblong (23–27 × 26–35 μ). 42*b*. *N. socia.*

Replace line 22 by:

Aeciospores small, mostly under 20 μ in diameter.	
Aeciospore-wall 1 μ thick.	43. *N. Polygoni.*
Aeciospore-wall 1–1.5 μ thick.	43*a*. *N. fuscata.*

Replace line 24 by:

Host belonging to family Chenopodiaceae.	
Aeciospores globoid (19–24 × 23–26 μ).	45. *N. Betae.*
Aeciospores ellipsoid (18–20 × 24–27 μ).	45*a*. *N. Chenopodii-fruticosi.*

Replace line 25 by:

Host belonging to family Caryophyllaceae.	
Aecia associated with smooth teliospores.	48. *N. Silenes.*
Aecia associated with verrucose teliospores.	48*a*. *N. Suksdorfii.*
Host belonging to family Ranunculaceae.	48*b*. *N. bifrons.*

Insert after line 36:

Host belonging to family Geraniaceae.	67*a*. *N. Geranii.*

Insert after line 37:

Host belonging to family Euphorbiaceae.	69*b*. *N. Janiphae.*

Replace line 39 by:

Host belonging to family Armeriaceae.	
Aeciospores 18–23 × 20–28 μ.	73. *N. Limonii.*
Aeciospores 16–20 × 18–26 μ.	73*a*. *N. Armeriae.*

Replace lines 44 and 45 by:

Host belonging to genus Salmea.	81*a*. *N. Salmeae.*
Host belonging to genus Senecio.	81*b*. *N. senecionicola.*
Host belonging to genus Leucosyris.	81*c*. *N. compacta.*
Host belonging to genus Polymnia.	81*d*. *N. Polymniae.*
Host belonging to genus Melanthera.	
Peridium cupulate.	82. *N. Martinii.*
Peridium rudimentary.	82*a*. *N. columbiana.*
Host belonging to genus Perymenium or Zexmenia.	83. *N. cucullata.*

Insert after line 47:

Host belonging to family Alliaceae.	
Aeciospores 20–24 μ in greatest diameter.	10. *N. Sporoboli.*
Aeciospores 21–26 μ in greatest diameter.	14. *N. Hordei.*

Replace line 50 by:

Host belonging to family Ranunculaceae.	
With Alopecurus as alternate host.	12. *N. Alopecuri.*
With Poa as alternate host.	16. *N. Poae.*
With Dactylis as alternate host.	16*a*. *N. Dactylidis.*
Host belonging to family Euphorbiaceae.	
Host belonging to genus Croton, Crotonopsis, or Stillingia.	4. *N. graminicola.*
Host belonging to genus Tithymalus.	56. *N. occidentalis.*

Insert after line 57:

Host belonging to family Rubiaceae.	7. *N. seditiosa.*

Insert after line 59:

Host belonging to genus Eupatorium or Stevia.	18. *N. Aegopogonis.*

221. In the key.

In line 4, for "*major*" read "*ignobilis.*"

Replace line 5 by:

Urediniospore-wall verrucose.	
Urediniospore-pores scattered.	7. *N. seditiosa.*
Urediniospore-pores equatorial.	7*b*. *N. Archeriana.*

Replace lines 7 and 8 by:

Teliospore-wall slightly thicker above.	5. *N. leptoderma.*
Teliospore-wall much thicker above.	

In line 13, for "*Sporoboli*" read "*aliicola.*"

Replace lines 24 and 25 by:

Teliospore-wall chestnut-brown; pedicel colorless.	
Teliospores 26–32 μ long.	14. *N. hordeina.*
Teliospores 29–40 μ long.	14*a*. *N. Beckmanniae.*

Replace lines 28 and 29 by:

Teliospore-wall light golden-brown; pedicel as long as spore or less.	
Host belonging to genus Poa.	16. *N. Poae.*
Host belonging to genus Dactylis.	16*a*. *N. Dactylidis.*

Replace lines 33 and 34 by:

Teliospore-wall thin (1–1.5 μ).	
Teliospore-wall uniformly thin.	12*a*. *N. Jacksonii.*
Teliospore-wall much thicker above (5–7 μ).	18. *N. Aegopogonis.*

Replace line 40 by:

Teliospore-wall evenly thick.	
Urediniospore-wall golden-yellow.	7*a*. *N. Aristidae.*
Urediniospore-wall dark cinnamon-brown.	15. *N. mystica.*

In line 71, for "*Lilii*" read "*Holwayi.*"

Insert after line 71:

Host belonging to family Amaryllidaceae.	40*a*. *N. affinis.*

Insert after line 77:

Host belonging to family Loranthaceae.	
Urediniospores ellipsoid, 26–33 μ long.	42*a*. *N. ornatipes.*
Urediniospores ellipsoid, 35–50 μ long.	42*c*. *N. euphlebia.*
Urediniospores mostly fusiform, 37–55 μ long.	42*b*. *N. socia.*

222. In the key.

Replace line 1 by:

Urediniospores verrucose; pores 4, equatorial.	
Teliospores smooth.	43. *N. Polygoni.*
Teliospores striately verrucose.	43*a*. *N. Rickeriana.*

Replace line 3 by:

Host belonging to family Chenopodiaceae.	
Teliospore-pedicel shorter than spore, deciduous.	45. *N. Betae.*
Teliospore-pedicel twice length of spore, persistent.	45*a*. *N. Chenopodii-fruticosi.*

Replace line 6 by:

Teliospore-wall slightly or not thickened above; pedicel fragile.	
Urediniospore-wall thick (2.5–3 μ).	47. *N. caryophyllina.*
Urediniospore-wall thin (1.5–2 μ).	
Urediniospore-wall echinulate.	47*a*. *N. verruculosa.*
Urediniospore-wall verrucose.	48*a*. *N. Suksdorfii.*

Insert after line 7:

Host belonging to family Ranunculaceae.	48*b*. *N. bifrons.*

Insert after line 33:

Teliospores striately verucose.	58*a*. *N. decorata.*

Insert in line 45, after "equatorial": "or superequatorial."

In line 50, for "pores 3" read "pores 2."

In line 51, for "pores 4" read "pores 3 (or 4)," and for "*Dolichi*" read "*Dolicholi.*"

Insert after line 51:

Host belonging to family Geraniaceae.	67*a*. *N. Geranii.*

Replace line 53 by:

Host belonging to family Euphorbiaceae.	
Teliospore-wall solid.	
Teliospore-wall thin, moderately verrucose.	69. *N. proëminens.*
Teliospore-wall thick, coarsely verrucose.	69*a*. *N. dictyosperma.*
Teliospore-wall laminate, thick.	
Pedicel with small collar next to spore.	69*b*. *N. Janiphae.*
Pedicel strongly bulbous next to spore.	69*c*. *N. globosa.*

Replace line 57 by:

Host belonging to family Armeriaceae.	
Telia compact; pedicel of teliospore persistent.	73. *N. Limonii.*
Telia pulverulent; pedicel of teliospore deciduous.	73*a*. *N. Armeriae.*

Insert after line 68:

Teliospore-wall smooth.	
Telia pulvinate; pedicel of teliospore persistent.	
Teliospores large, 30–42 μ long.	81*a*. *N. compacta.*
Teliospores smaller, 26–36 μ long.	
Urediniospores globoid, 21–26 μ in diameter.	81*b*. *N. Polymniae.*
Urediniospores ellipsoid, 26–28 μ long.	81*c*. *N. senecionicola.*
Telia pulverulent; pedicel of teliospore deciduous.	
Teliospores large, 18–23 × 35–50 μ.	81*d*. *N. Salmeae.*
Teliospores smaller, 12–20 × 22–34 μ.	82*a*. *N. columbiana.*
Teliospore-wall verrucose.	

222. **Nigredo Sparganii.**

Add the exsiccati: Barth. Fungi Columb. *3896;* Barth. N. Am. Ured. *998.*

223. **Nigredo pedatata.**

Under Violaceae, change the locality for *Viola lanceolata* L. from Delaware to New Jersey.

Add the hosts, under Violaceae:

Viola cucullata Ait., West Virginia.
Viola papilionacea Pursh, North Carolina.
Viola striata Ait., North Carolina.
Viola tricolor L., Connecticut.

Add the hosts, under Poaceae:

Andropogon scoparius Michx. (*Schizachyrium scoparium* Nash), New Jersey, North Carolina.
Andropogon ternarius Michx. (*A. argyraeus* Schult.), Florida.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 11, f. 152.*

Add the exsiccati: Barth. N. Am. Ured. *1789, 2580, 2994.*

224. **Nigredo Clignyi.**

Add the synonym: *Puccinella Clignyi* Sydow, Ann. Myc. **20**: 123. 1922.

Add the host: *Andropogon brevifolius* Sw., Cuba.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 12, f. 154.*

224. **Nigredo graminicola.**

Add the synonyms: *Aecidium crotonopsidis* Burrill, Bot. Gaz. **9**: 190. 1884. *Aecidium splendens* Wint. in Rab.-Wint. Fungi Eur. *3224.* 1885. *Aecidium Stillingiae* Tracy & Earle, Bull. Torrey Club **26**: 493. 1899. *Puccinella graminicola* Sydow, Ann. Myc. **20**:123. 1922.

Substitute in place of the line pertaining to pycnia and aecia:

O. Pycnia chiefly epiphyllous, in small groups, on discolored spots, inconspicuous, honey-yellow becoming brownish, in section globoid or flask-shaped, 80–100 μ broad by 100–130 μ high; ostiolar filaments up to 50 μ long.

I. Aecia hypophyllous, numerous, aggregate and often concentric in groups 5–15 mm. across, on much larger discolored spots, short-cylindric or cupulate, 0.3–0.4 mm. in diameter; peridium whitish, the margin erose; peridial cells short-rhomboidal, 15–18 by 20–28 μ, mainly abutted, slightly overlapping on the outer border, the outer wall 6–9 μ thick, faintly transverse-striate, smooth, the inner wall much thinner, 3–4 μ, strongly verrucose; aeciospores globoid, or broadly ellipsoid, 16–20 by 20–26 μ; wall colorless, thin, 1.5–2 μ, finely verrucose.

ON EUPHORBIACEAE:
Croton monanthogynus Michx., Illinois, Missouri.
Crotonopsis linearis Michx., Illinois.
Sebastiana ligustrina (Michx.) Muell.-Arg. (*Stillingia ligustrina* Michx.), Mississippi.
Stillingia angustifolia (Torr.) S. Wats., Florida.
Stillingia sylvatica L., Oklahoma.

Add the host, under Poaceae: *Panicum altum* Hitchc. & Chase, Florida.

Add the exsiccati: Barth. Fungi Columb. *3993;* Barth. N. Am. Ured. *2092;* Ellis & Ev. Fungi Columb. *547;* Ellis & Ev. N. Am. Fungi *1824;* Rab.-Wint. Fungi Eur. *3224;* Roum. Fungi Gall. *3860.*

224. **Nigredo leptoderma.**

Add the synonyms: *Uredo Panici* Arth. Bull. Torrey Club **29**: 231. 1902. Not *Nigredo Panici* Arth. 1906. *Uredo Setariae-italicae* Dietel, Bot. Jahrb. **32**: 632. 1903. *Uromyces Setariae-italicae* Yoshino, Bot. Mag. Tokyo **20**: 247. 1906. *Uromyces nitero-yensis* Rangel, Arch. Mus. Nac. Rio de Janeiro **18**: 160. 1916. *Uredo Panici-maximi* Rangel, Arch. Mus. Nac. Rio de Janeiro **18**: 160. 1916.

Add the hosts:

Lasiacis divaricata (L.) Hitchc. (*Panicum divaricatum* L.), Mona Island; Porto Rico.
Lasiacis ligulata Hitchc. & Chase, Porto Rico.
Lasiacis ruscifolia (H.B.K.) Hitchc. (*Panicum Liebmannianum* Fourn.), Guatemala.
Lasiacis Sloanei (Griseb.) Hitchc. (*Panicum Sloanei* Griseb.), Porto Rico.
Lasiacis sorghoidea (Desv.) Hitchc. & Chase (*Panicum sorghoideum* Desv., *P. lanatum* Sw., *Lasiacis Swartziana* Hitchc.), Jamaica, Porto Rico, St. Croix.
Panicum amarulum Hitchc. & Chase, Florida, Virginia.
Panicum amarum Ell., Florida.
Panicum fasciculatum Sw., Panama.
Panicum maximum Jacq., Florida.
Panicum parvifolium Lam., Porto Rico.

Insert: ILLUSTRATION: Arch. Mus. Nac. Rio de Janeiro **18**: *pl. 5, f. 3–15, pl. 6, f. 3, 4.*

Add the exsiccati: Barth. N. Am. Ured. *857.*

225. **Nigredo major.**

Reduce this name to synonymy, and substitute: **Nigredo ignobilis** (Sydow) Arthur.

Add the synonyms: *Uredo ignobilis* Sydow, Ann. Myc. **4**: 444. 1906. *Uromyces ignobilis* Arth. Mycologia **7**: 181. 1915.

Add the hosts:

Leptochloa domingensis (Jacq.) Trin., Cuba.
Muhlenbergia Reverchonii Vasey, Texas.
Sporobolus indicus (L.) R. Br., Panama; Cuba; Porto Rico.
Sporobolus virginicus (L.) Kunth, Porto Rico.

Change the type locality to read: Pusa, India, on *Sporobolus diandrus.*

Change the distribution to read: Southern Texas to Panama, and in the West Indies; also in South America and India.

225. **Nigredo seditiosa.**

Add the synonym: ?*Aecidium oldenlandianum* Ellis & Tracy, Jour. Myc. **7**: 43. 1891.

Add the hosts, under Plantaginaceae:

Plantago heterophylla Nutt., Oklahoma.
Plantago rhodosperma Decaisne, Texas.

Insert after the hosts on Plantaginaceae:

ON RUBIACEAE:
?*Houstonia minima* Beck, Texas.
?*Houstonia minor* (Michx.) Britton (*H. patens* Ell.), Alabama, Texas.
?*Houstonia purpurea* L., Mississippi.

Add the hosts, under Poaceae:

Aristida Curtisii (A. Gray) Nash, Oklahoma.
Aristida desmantha Trin. & Rupr., Oklahoma.
Aristida longespica Poir. (*A. gracilis* Ell.), Arkansas, Indiana, New Jersey.
Aristida longiseta Steud., Colorado.
Aristida micrantha (Vasey) Nash, Texas.
Aristida ramosissima Engelm., Indiana.
Aristida tuberculosa Nutt., New York.

Add the illustration: Sydow, Monog. Ured. **2**: *pl. 12, f. 157.*

Add the exsiccati: Barth. Fungi Columb. *4196, 4596;* Barth. N. Am. Ured. *995, 996, 1797, 3396.*

226. Insert:

7a. **Nigredo Aristidae** (Ellis & Ev.) Arthur.

Uromyces Aristidae Ellis & Ev. Jour. Myc. **3**: 56. 1887.
Puccinia ? Scribneriana Arth. Bull. Torrey Club **46**: 109. 1919.

O and I. Pycnia and aecia unknown.

II. Uredinia epiphyllous, intercostal, crowded and sometimes confluent, linear, 0.5–2 mm. long, pulverulent, chestnut-brown, ruptured epidermis inconspicuous; paraphyses numerous, erect or variously bent and incurved, capitate or clavate-capitate, with narrow neck and linear pedicel, 15–24 by 39–64 μ, the wall smooth, golden-yellow, 3–6 μ thick at apex, about 2 μ thick below; urediniospores globoid or ellipsoid, 23–29 by 27–35 μ; wall dark cinnamon-brown, thick, 3–3.5 μ, moderately and rather strongly verrucose-echinulate, the pores 6–8, scattered.

III. Telia epiphyllous, intercostal, linear, 2–4 mm. long, early naked, blackish-brown, ruptured epidermis inconspicuous; teliospores globoid or broadly obovoid, 18–26 by 23–26 μ, rounded above and usually below; wall chestnut-brown, 2–3 μ thick, thicker above, 5–7 μ, at first smooth, at maturity becoming tesselate or even tuberculate above; pedicel slender, colorless, thrice length of spore or longer.

ON POACEAE:
Aristida arizonica Vasey, New Mexico.
TYPE LOCALITY: [Sante Fé], New Mexico, on *Aristida* [*arizonica*].
DISTRIBUTION: Northern New Mexico.

7b. **Nigredo Archeriana** (Arth. & Fromme) Arthur.

Uromyces Archerianus Arth. & Fromme, Torreya **15**: 261. 1915.

O and I. Pycnia and aecia unknown.

II. Uredinia not seen; urediniospores from telial sori globoid or broadly ellipsoid, 19–23 by 21–26 μ; wall golden- to cinnamon-brown, moderately thick, 2–3 μ, finely and inconspicuously verrucose, the pores usually obscure, 2, equatorial.

III. Telia hypophyllous, prominent, oblong or linear, 0.5–10 mm. or more long, early naked, pulvinate, blackish-brown; teliospores globoid or broadly ellipsoid, 18–26 by 25–32 μ, rounded above and below; wall dark chestnut-brown, 1.5–2 μ thick, much thicker above, 7–9 μ, smooth; pedicel yellowish or colorless, firm, 3–4 μ thick, once to twice length of spore.

ON POACEAE:
Chloris elegans H.B.K., New Mexico.
TYPE LOCALITY: Mesilla Park, New Mexico, on *Chloris elegans*.
DISTRIBUTION: Known only from the type locality.

226. **Nigredo minima.**

Add the synonym: *Puccinella minima* Sydow, Ann. Myc. **20**: 123. 1922.
Add the illustration: Sydow, Monog. Ured. **2**: *pl. 13, f. 166.*

226. **Nigredo Halstedii.**

Add the synonyms: *Uromyces ovalis* Dietel, Bot. Jahrb. **37**: 97. 1905. *Ontotelium digitatum* Sydow, Ann. Myc. **19**: 174. 1921.

Add the illustrations: Sydow, Monog. Ured. **2**: *pl. 12, f. 164;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 9, f. 9.*

Add the exsiccati: Barth. N. Am. Ured. *1092.*

227. **Nigredo Sporoboli.**

Reduce this name to synonymy, and substitute: **Nigredo alliicola** (Wint.) Arthur.

Add the synonyms: *Aecidium alliicolum* Wint. in Rab.-Wint. Fungi Eur. *3317.* 1885. *Puccinella Sporoboli* Sydow, Ann. Myc. **20**: 123. 1922.

Substitute for the line pertaining to pycnia and aecia:

O. Pycnia amphigenous and caulicolous, scattered among the aecia, numerous, inconspicuous, honey-yellow, globoid or flask-shaped, 60–190 μ broad by 90–150 μ high; ostiolar filaments agglutinate, 30–50 μ long.

I. Aecia amphigenous and caulicolous, in orbicular or elongate groups 5–15 mm. across, cupulate or short-cylindric, small, 0.2–0.4 mm. in diameter; peridium yellowish, the margin erect, erose; peridial cells rhomboidal, 20–24 by 24–30 μ, considerably overlapping, the outer wall colorless, transversely striate, 10–14 μ thick, smooth, the inner wall much thinner, 3–4 μ, closely and coarsely verrucose; aeciospores angularly oblong or broadly ellipsoid, 18–23 by 24–30 μ; wall colorless, 1–2 μ thick, very finely and obscurely verrucose, appearing smooth when wet.

ON ALLIACEAE:
Allium canadense L., Missouri, Nebraska.
Allium mutabile Michx., Kansas.
Allium reticulatum Don, Kansas, Nebraska, South Dakota.
Allium stellatum Ker, Kansas.

Add the host, under Poaceae: *Sporobolus vaginaeflorus* Torr. (*Vilfa vaginaeflora* Torr.), Kansas.

Change the type locality to read: [Perryville, Missouri], on "*Allium stellatum*," error for *A. canadense*.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 14, f. 174.*

Add the exsiccati: Barth. Fungi Columb. *2202, 2401;* Barth. N. Am. Ured. *300, 397, 502, 1498, 2700, 3000;* Ellis & Ev. Fungi Columb. *1070;* Rab.-Wint. Fungi Eur. *3317.*

227. **Nigredo Eragrostidis.**

Add the synonyms: *Nielsenia Eragrostidis* Sydow, Ann. Myc. **19**: 171. 1921. *Puccinella Eragrostidis* Sydow, Ann. Myc. **20**: 123. 1922.

Add the hosts:

Eragrostis capillaris Nees, Texas.
Eragrostis ciliaris (L.) Link, Porto Rico.
Eragrostis lugens Nees, Arizona.
Eragrostis major Host (*E. megastachya* Link), Mexico (state).

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 12, f. 161.*

Add the exsiccati: Barth. N. Am. Ured. *384, 1589.*

227. **Nigredo Alopecuri.**

Add the synonym: *Nielsenia Alopecuri* Sydow, Ann. Myc. **19**: 171. 1921.

Substitute for the line pertaining to pycnia and aecia:

O. Pycnia chiefly epiphyllous, few, punctiform, inconspicuous, honey-yellow, globoid, 75–125 μ in diameter; ostiolar filaments short.

I. Aecia chiefly hypophyllous, in more or less circular groups 3–8 mm. across, on somewhat discolored areas, cupulate, small, 0.2–0.3 mm. in diameter; peridium yellowish, the margin erose; peridial cells rhomboidal, 18–21 by 16–35 μ, abutted or slightly overlapping, the outer wall 6–8 μ thick, smooth, the inner wall 2–4 μ thick, verrucose; aeciospores oblong or ellipsoid, 13–18 by 19–23 μ; wall colorless, thin, 1 μ, very closely and finely verrucose.

ON RANUNCULACEAE:
Ranunculus Macounii Britton, Manitoba, Saskatchewan.
Ranunculus sceleratus L. (*R. eremogenes* Greene), Colorado; Manitoba.

Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 9, f. 8.*

Add the exsiccati: Barth. Fungi Columb. *4885;* Barth. N. Am. Ured. *1583, 1684.*

228. Insert:

12a. **Nigredo Jacksonii** (Arth. & Fromme) Arthur.

Uromyces Jacksonii Arth. & Fromme, Torreya **15**: 260. 1915.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous and caulicolous, scattered, bullate, oblong or linear, 0.3–1 mm. long, tardily dehiscent by slit in the epidermis, yellow; paraphyses none; urediniospores globoid or broadly ellipsoid, 21–27 by 24–30 μ; wall pale-yellow, moderately thin, 1.5–2 μ, finely echinulate, the pores 6–8, scattered.

III. Telia similar to the uredinia, long covered by the epidermis, blackish-brown; teliospores angularly globoid or ellipsoid, 19–25 by 20–30 μ; wall light chestnut-brown, uniformly 1.5 μ thick, smooth; pedicel colorless, about half length of spore, delicate.

ON POACEAE:
Agrostis alba maritima (Lam.) G. Meyer (*A. maritima* Lam.), Oregon.
Agrostis Hallii Vasey, Oregon.
Agrostis pallens Trin., California.
Deschampsia caespitosa (L.) Beauv. (*Aira caespitosa* L., *A. alpina* L.), California, Oregon.
Deschampsia elongata (Hook.) Munro (*Aira elongata* Hook.), Oregon, Washington.
Hordeum jubatum L., Oregon.
Hordeum nodosum L., California, Oregon, Washington.
Scribneria Bolanderi (Thurb.) Hack., Oregon.
TYPE LOCALITY: Corvallis, Oregon, on *Deschampsia elongata*.
DISTRIBUTION: Pacific coast from northern Washington to central California.
EXSICCATI: Barth. Fungi Columb. *4460, 4495, 4992;* Barth. N. Am. Ured. *1237, 1989, 3389.*

228. **Nigredo amphidyma.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 12, f. 163.*

228. **Nigredo Hordei.**

Reduce this name to synonymy, and substitute: **Nigredo hordeina** Arthur.

Insert, after the first synonym: Not *U. Hordei* Nielsen. 1875.

Add the synonym: *Nielsenia Hordei* Sydow, Ann. Myc. **19**: 171. 1921.

Replace the line pertaining to pycnia and aecia by:

O. Pycnia amphigenous, in small groups or among the aecia, honey-yellow, becoming brownish, globoid in section, 90–100 μ in diameter; ostiolar filaments short.

I. Aecia amphigenous, in circular or elliptic groups 2–5 mm. across, on pale unthickened spots, cupulate, about 0.5 mm. in diameter, the overarching epidermis prominent; peridium colorless, fragile, the margin eroded and slightly recurved; peridial cells oblong or rhomboidal, 16–23 by 26–34 μ, somewhat overlapping, the outer wall thick, 6–8 μ, transversely striate, smooth, the inner wall thinner, 3–4 μ, verrucose; aeciospores angularly globoid or ellipsoid, 19–21 by 21–26 μ; wall pale-yellow or colorless, 1.5–2.5 μ thick, closely and minutely verrucose.

ON ALLIACEAE:
Nothoscordium bivalve (L.) Britton (*Ornithogalum bivalve* L., *Allium striatum* Jacq.), Oklahoma, Texas.

Omit from the localities of hosts under Poaceae " California " after *Hordeum nodosum* and insert " Colorado, Utah."

Add the exsiccati: Barth. N. Am. Ured. *387, 1693, 1889, 2191, 2491, 2992, 3285, 3385.*

228. Insert:

14a. **Nigredo Beckmanniae** (H. S. Jackson) Arthur.

Uromyces Beckmanniae H. S. Jackson, Brooklyn Bot. Gard. Mem. 1: 274. 1918.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous, scattered, elliptic, 0.5–0.8 mm. long, soon naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 19–24 by 23–29 μ; wall colorless or pale-yellow, 2–2.5 μ thick, finely verrucose-echinulate, the pores 8–10, scattered.

III. Telia amphigenous and caulicolous, scattered or crowded, oblong, 0.4–.07 mm. across, often confluent to form crusts or lines, tardily naked, blackish-brown; teliospores obovoid or ellipsoid, angular, 20–26 by 29–40 μ, rounded or angular above, narrowed below; wall chestnut-brown, 1–2 μ thick, 3–6 μ above, smooth but showing distinct longitudinal lines; pedicel colorless or slightly tinted next to spore, about as long as spore, usually breaking away.

ON POACEAE:
Beckmannia erucaeformis (L.) Host, Oregon.
TYPE LOCALITY: Oak Creek [near Corvallis], Oregon, on *Beckmannia erucaeformis*.
DISTRIBUTION: Western Oregon.

228. **Nigredo mystica.**

Change the description of the teliospore-wall from " finely and inconspicuously verrucose " to " smooth, appearing granular when dry."

Add the host, under Poaceae: *Hordeum nodosum* L., Utah, Washington.

Add the exsiccati: Barth. Fungi Columb. *4191, 4192;* Barth. N. Am. Ured. *693, 793, 1494.*

229. **Nigredo Poae.**

Add the synonym: *Nielsenia Poae* Sydow, Ann. Myc. **19**: 171. 1921.

Add the host: *Poa pratensis* L., Vermont; Alberta.

Add the illustration: Grove, Brit. Rust. Fungi *f. 78, 79;* Fl. Ibér. Ured. **2**: *f. 3.*

229. Insert:

16a. **Nigredo Dactylidis** (G. Otth) Arthur.

Uromyces Dactylidis G. Otth, Mitt. Nat. Ges. Bern **1861**: 85. 1861.
Uromyces graminum Cooke, Handb. Brit. Fungi 520. 1871.

O. Pycnia chiefly epiphyllous, few, in small groups, on yellowish spots, honey-yellow, flattened-globoid, 100 μ high by 130 μ wide; ostiolar filaments 60–70 μ long, agglutinate to form a short column.

I. Aecia hypophyllous, gregarious, in crowded groups 1–3 mm. across, on somewhat larger discolored spots, cupulate, short, 0.2–0.4 mm. in diameter; peridium whitish, the margin somewhat recurved, finely lacerate; peridial cells rhombic or rhomboidal, 20–22 by 24–30 μ, abutted or slightly overlapping, the outer wall 7–10 μ thick, smooth, the inner wall 3–5 μ, closely and finely verrucose; aeciospores oblong or broadly ellipsoid, 15–18 by 20–24 μ; wall colorless, thin, 1 μ, very minutely and obscurely verrucose.

ON RANUNCULACEAE:
Ranunculus spp. in Europe, not yet found in North America.

II. Uredinia amphigenous, scattered, small, oval or oblong, 0.1–0.3 mm. long, rather tardily naked, pulverulent, golden-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 20–26 by 24–29 μ; wall yellowish, moderately thin, 1.5–2 μ, finely and moderately echinulate, the pores 6–8, scattered.

III. Telia chiefly hypophyllous, scattered or somewhat in lines, oblong or linear, small, 0.2–1 mm. long, long covered by the epidermis, blackish; teliospores obovoid, 15–20 by 20–30 μ, rounded above, somewhat narrowed below; wall golden-brown, 1–1.5 μ thick, slightly thicker above, 2–3 μ, smooth; pedicel golden-yellow, as long as spore or less.

Recent studies indicate that *Nigredo Poae* (page 229), *N. Alopecuri* (page 227), and *N. Dactylidis* are better considered as races of one variable species, which is correlated with *Dicaeoma Clematidis* (DC.) Arth. (page 333), and that they should eventually be united with it under one name. The three *Nigredo* races are not combined at this time partly to avoid inconvenient changes and partly to further emphasize the character of their relationship.

ON POACEAE:
Dactylis glomerata L., North Carolina, Virginia.
TYPE LOCALITY: [Switzerland,] on *Dactylis glomerata.*
DISTRIBUTION: Two localities in the Blue Ridge Mountains; also in Europe.
ILLUSTRATION: Grove, Brit. Rust Fungi *f. 77;* Fl. Ibér. Ured. **2**: *f. 2.*

229. **Nigredo Epicampis.**

Add the host: *Epicampes rigens* Benth., Arizona.

Add the illustration: Sydow, Monog. Ured. **2**: *pl. 12, f. 160.*

230. **Nigredo Aegopogonis.**

Add the synonyms: *Aecidium roseum* Dietel & Holway, Bot. Gaz. **24**: 31. 1897. *Puccinella Aegopogonis* Sydow, Ann. Myc. **20**: 123. 1922.

Replace the line pertaining to pycnia and aecia by:

O. Pycnia epiphyllous, numerous, crowded in groups 0.5–2 mm. across, on yellow spots with roseate border 5–20 mm. across, conspicuous, golden-yellow, becoming brownish, globoid or flask-shaped in section, 120–140 μ broad; ostiolar filaments 40 μ long or more.

I. Aecia hypophyllous, in irregular groups 2–10 mm. across, opposite the pycnia, often in circles, cupulate, 0.1–0.2 mm. in diameter; peridium light-yellow, the margin somewhat recurved, erose; peridial cells rhombic or rhomboidal, 19–24 by 30–42 μ, usually seen in face view, overlapping, the outer wall transversely striate, 5–7 μ thick, smooth, the inner wall thinner, 3–4 μ thick, finely and closely verrucose; aeciospores globoid or ellipsoid, 16–26 by 22–33 μ; wall colorless, 1.5–2 μ thick, much thicker above, 5–8 μ, closely and finely verrucose.

On Carduaceae:
Eupatorium deltoideum Jacq., Oaxaca.
Eupatorium glabratum H.B.K., Hidalgo, Mexico (state).
Eupatorium tubiflorum Benth., Michoacan.
Eupatorium sp., Jalisco, Morelos.
Stevia rhombifolia H.B.K., Hidalgo, Oaxaca.

Add: Illustration: Sydow, Monog. Ured. **2**: *pl. 12, f. 151.* Exsiccati: Barth. N. Am. Ured. *1366.*

230. **Nigredo Peckiana.**

Add the synonym: *Puccinella Peckiana* Sydow, Ann. Myc. **20**: 123. 1922.

Substitute for the host, under Chenopodiaceae, *"Salicornia ambigua": Salicornia pacifica* Standley (*S. ambigua* Michx.), California, Washington; British Columbia.

Insert: Illustration: Sydow, Monog. Ured. **2**: *pl. 12, f. 161.*

Add the exsiccati: Barth. Fungi Columb. *4497;* Barth. N. Am. Ured. *796, 1995, 2496, 3096.*

231. **Nigredo Polemonii.**

Add the synonyms: *Aecidium magnatum* Arth. Bull. Torrey Club **28**: 664. 1901. *Uromyces Polemonii* Barth. N. Am. Ured. *597.* 1913. *Uromyces Steironematis* Arth. Mycologia **9**: 311. 1917. *Uromyces magnatus* Arth. Mycologia **9**: 311. 1917. *Uromyces acuminatus magnatus* J. J. Davis, Trans. Wis. Acad. **7**: 410. 1922. *Uromyces acuminatus Steironematis* J. J. Davis, Trans. Wis. Acad. **7**: 410. 1922. *Uromyces acuminatus Polemonii* J. J. Davis, Trans, Wis. Acad. **7**: 411. 1922.

Insert after the description of the aecia the hosts:

On Convallariaceae:
Polygonatum commutatum (R. & S.) Dietr. (*P. giganteum* Dietr., *Salomonia commutata* Britton), Illinois, Iowa, Minnesota, Nebraska, North Dakota, South Dakota.
Vagnera racemosa (L.) Morong (*Smilacina racemosa* Desf.), Colorado, Minnesota, Wisconsin.
Vagnera stellata (L.) Morong (*Smilacina stellata* Desf.), Colorado, Illinois, Indiana, Montana, Nebraska, New York, North Dakota, South Dakota.

Add the host, under Caryophyllaceae: *Tissa salina* (Presl) Greene (*T. marina* Britton, *Spergularia salina* Presl), California.

Add the hosts, under Primulaceae:

Dodecatheon Meadia L., Nebraska.
Dodecatheon thornense Lunell, North Dakota.

Add the hosts, under Polemoniaceae:

Gilia spicata Nutt., Colorado.
Phlox maculata L., Indiana.

Add the illustration: Sydow, Monog. Ured. **2**: *pl. 14, f. 172.*

Add the exsiccati: Barth. Fungi Columb. *3995, 4095, 4162, 4393, 4467, 4764;* Barth. N. Am. Ured. *284, 597, 661, 797, 1074, 1170, 1269, 1294, 2293, 2695, 2696;* Brenckle, Fungi Dak. *1, 226, 259;* D. Griff. W. Am. Fungi *243;* Thaxter, Rel. Farl. *300;* Sydow, Ured. *2298, 2401.*

232. **Nigredo Eleocharidis.**

Add the exsiccati: Barth. N. Am. Ured. *784, 885, 985;* Vesterg. Micr. Rar. Sel. *1661.*

232. **Nigredo Rhyncosporae.**

Change the second synonym to read: *Uromyces rhynchosporicola* P. Henn.

Omit from the hosts the two following names (assigned to *Dicaeoma angustatoides*, page 352): *Rynchospora aurea* and *R. cyperoides;* also omit the following name (assigned to *Dicaeoma consobrinum*, page 352): *Rynchospora polyphylla.*

Add the hosts:

Rynchospora gracilenta A. Gray, District of Columbia.
Rynchospora setacea (Berg.) Boeckl., Porto Rico.

Add to the distribution: "also in South America."

Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 9, f. 6.*

Add the exsiccati: Barth. N. Am. Ured. *2396, 2596, 2699;* Thaxter, Rel. Farl. *298;* Sydow, Ured. *2405.*

233. **Nigredo Scleriae.**

Add the hosts:

Scleria canescens Boeckl., Porto Rico.
Scleria lithosperma (L.) Sw., Cuba.

233. **Nigredo Scirpi.**

Add the synonyms: *Uromyces ? americanus* Speg. Anal. Mus. Nac. Buenos Aires **19**: 310. 1909. *Aecidium Hydrocotylinum* Speg. Anal. Mus. Nac. Buenos Aires **19**: 321. 1909.

Add the hosts, under Ammiaceae:

Hydrocotyle australis Coult. & Rose, Texas.
Hydrocotyle umbellata L., Delaware, Florida, Massachusetts.
Hydrocotyle verticillata Thunb. (*H. interrupta* Muhl.), Louisiana.

Omit from the hosts all pertaining to *Glaux maritima* (now assigned to *Dicaeoma Distichlidis*, page 317).

Add the hosts, under Cyperaceae:

Scirpus californicus (C. Meyer) Britton, California.
Scirpus Fernaldi Bicknell, New York.

Insert: ILLUSTRATION: Grove, Brit. Rust Fungi *f. 76;* Fl. Ibér. Ured. **2**: *f. 1.*

Add the exsiccati: Barth. Fungi Columb. *3996, 4195, 4997;* Barth. N. Am. Ured. *498, 896, 897, 1796, 1898, 3098, 3499;* Brenckle, Fungi Dak. *179, 374;* Thaxter, Rel. Farl. *299;* Sydow, Ured. *2505;* Vesterg. Micr. Rar. Sel. *1587.*

234. **Nigredo minuta.**

Add the hosts:

Carex intumescens Rudge, Wisconsin.
Carex muskingumensis Schw., Michigan.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 11, f. 148.*

Add the exsiccati: Barth. N. Am. Ured. *893.*

234. **Nigredo valens.**

Add the synonym: *Puccinella valens* Sydow, Ann. Myc. **20**: 123. 1922.

235. **Nigredo perigynia.**

Add the synonyms: *Puccinella perigynia* Sydow, Ann. Myc. **20**: 123. 1922. *Uromyces perigynius alliporulus* J. J. Davis, Trans. Wis. Acad. **21**: 299. 1924.

In the description of the pycnia, for "globoid, small, 60–80 μ in diameter," read: flattened-globoid, 110–150 μ broad by 80–100 μ high.

Add the hosts, under Carduaceae:

Ratibida columnifera (Nutt.) Wooton & Standley (*R. columnaris* D. Don, *Lepachys columnaris* T. & G.), North Dakota.
Rudbeckia laciniata L. (*R. ampla* A. Nelson), Indiana, Iowa, Missouri, Montana, Nebraska, North Dakota, Pennsylvania, South Dakota, Wisconsin, Wyoming.
Rudbeckia triloba L., Delaware.

Append to the description of the uredinia "or sometimes subpolar."

Omit, under Cyperaceae, after *Carex deflexa:* Indiana, Massachusetts, Nova Scotia.

Add the hosts, under Cyperaceae:

Carex abbreviata Prescott, North Dakota.
Carex arctata Boott, New York.
Carex Asa-Grayi L. H. Bailey (*C. Grayi* Carey), Indiana, Wisconsin.
Carex athrostachya Olney, Oregon, Washington.
Carex communis L. H. Bailey, Maine.
Carex lanuginosa Michx., Pennsylvania.
Carex nigro-marginata Schw., Nova Scotia.
Carex normalis Mackenzie (*C. mirabilis* Dewey), District of Columbia.
Carex pennsylvanica Lam., Maine; Nova Scotia.
Carex sparganioides Muhl., Minnesota.
Carex stipata Muhl., New York.
Carex varia Muhl., Indiana, Maine, Massachusetts, New York, Wisconsin; Nova Scotia.
Carex virescens Muhl., New York.

Insert: ILLUSTRATION: Rhodora **12**: 125, *f. 1.*

Add the exsiccati: Barth. N. Am. Ured. *701, 1094;* Brenckle, Fungi Dak. *513;* Ellis, N. Am. Fungi *1018a;* Sydow, Ured. *97.*

235. **Nigredo uniporula.**

Add the synonym: *Puccinella uniporula* Sydow, Ann. Myc. **20**: 123. 1922.

236. **Nigredo Caladii.**

Add the host: *Arisaema Stewardsonii* Britton, New York.

Add to the line for the type locality: error for *Arum virginicum.*

Add the exsiccati: Barth. Fungi Columb. *3991, 4186, 4296, 4888;* Barth. N. Am. Ured. *588, 589, 681, 882, 983, 1090, 1386, 1486, 1487, 1586, 1587, 1687, 1785, 2984;* Brenckle, Fungi Dak. *480;* Thaxter, Rel. Farl. *288a, b.*

237. **Nigredo pyriformis.**

Add the exsiccati: Barth. Fungi Columb. *4096;* Barth. N. Am. Ured. *598, 699, 2698.*

237. **Nigredo Commelinae.**

Add the synonym: *Uredo Miyochiana* Dietel, in Sydow, Ured. *1348*, hyponym. 1899.

Change Florida to Texas after the host *Commelina erecta*, and omit from the hosts: *C. virginica*, and *Commelina* sp.; the localities for the former to be placed after *C. angustifolia*, and for the latter after *C. elegans.*

Add the hosts:

Commelina longicaulis Jacq., Costa Rica; Cuba; Jamaica.
Commelinantia Pringlei (S. Wats.) Tharp (*Tradescantia Pringlei* S. Wats.), Nuevo León.
Tradescantia cumanensis Kunth, Guatemala.

238. **Nigredo Pontederiae.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 11, f. 147.*

238. **Nigredo Junci.**

Correct the citations of two of the synonyms to read: *Puccinella truncata* Fuckel, Jahrb. Ver. Nat. Nass. **15**: 18. 1861. *Puccinella Junci* Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 60. 1870.

Add the synonyms: *Aecidium Bahiae* Berk. & Curt.; Berk. Grevillea **3**: 60. 1874. *Aecidium compositarum Inulae* Rab. Deutschl. Krypt.-Fl. **1**: 16. 1844.

Add the hosts, under Carduaceae:

Arnica cana Greene, California.
Arnica mollis Hook., Montana.
Arnica stricta A. Nelson, Wyoming.
Aster macrophyllus L., Ontario.
Cirsium foliosum (Hook.) DC., Wyoming.
Cirsium undulatum (Nutt.) Spreng. (*Carduus undulatus* Nutt.), Alberta.
Eriophyllum stachadifolium (Spreng.) Greene (*Bahia stachadifolia* DC.), California.
Grindelia robusta Nutt., California.
Helianthus annuus L., Nebraska.
Helianthus decapetalus L., Nebraska.
Helianthus divaricatus L., New York, Virginia.
Helianthus Maximiliani Schrad., Nebraska, North Dakota.

Helianthus Nuttallii T. & G., Wyoming.
Helianthus occidentalis Riddell, Iowa.
Helianthus Parishii A. Gray, California.
Helianthus petiolaris Nutt., Oklahoma.
Helianthus scaberrimus Ell. (*H. rigidus* Desf.), Nebraska, South Dakota.
Helianthus strumosus L., Illinois, Missouri, Wisconsin.
Helianthus subtuberosus Bourgeau, Alberta.
Helianthus tracheliifolius Mill., Kansas.
Helianthus tuberosus L. (*H. tuberosus subcanescens* A. Gray), Nebraska, North Dakota; Manitoba.
Heliopsis helianthoides (L.) Sweet (*H. laevis* Pers.), Indiana, Missouri.

Add the hosts, under Juncaceae:

Juncus ater Rydb., Alberta.
Juncus Lescurii elatus S. Wats., California, Oregon.
Juncus Mertensianus Bong., Idaho.
Juncus patens Meyer, California.
Juncus Torreyi Coville (*J. nodosus megacephalus* Torr.), California, Nebraska.
Juncus xiphoides E. Meyer, California.

Add the illustration: Grove, Brit. Rust Fungi *f. 75;* Fl. Ibér. Ured. **2**: *f. 4.*

Add the exsiccati: Barth. Fungi Columb. *2961, 3759, 3941, 4696, 4993;* Barth. N. Am. Ured. *392, 790, 791, 1050, 1291, 1292, 1347, 1493, 1697, 1788, 1990, 2492, 2493, 2694, 3093, 3288, 3494;* Brenckle, Fungi Dak. *45a, 350;* Rab.-Wint.-Paz. Fungi Eur. *3835a;* Sydow, Ured. *1394.*

239. **Nigredo Silphii.**

Add the host, under Carduaceae: *Aster macrophyllus* L., Wisconsin.

Add the hosts, under Juncaceae:

Juncus acuminatus Michx., Alabama.
Juncus georgianus Coville, Georgia.
Juncus occidentalis (Coville) Wiegand, Oregon.

Add the exsiccati: Barth. Fungi Columb. *3792;* Barth. N. Am. Ured. *599, 898, 997, 1198, 2098, 2199, 2299, 2397, 2499, 2598, 2599, 2799, 2998, 3099, 3500;* Thaxter, Rel. Farl. *295;* correct Barth. Fungi Columb. "*9394*" to read *2394.*

239. **Nigredo Junci-effusi.**

Add the hosts, under Juncaceae:

Juncus Bolanderi Engelm., Oregon, Washington.
Juncus falcatus E. Meyer, California.
Juncus Mertensianus Bong., Oregon.

Add the exsiccati: Barth. Fungi Columb. *4791, 5095;* Barth. N. Am. Ured. *689, 1391, 1595, 1991, 2889;* Thaxter, Rel. Farl. *294.*

240. **Nigredo Zygadeni.**

Add the hosts:

?*Anticlea chlorantha* (Richards.) Rydb. (*Zygadenus glaucus* Nutt.), Iowa.
Toxicoscordion gramineum Rydb. (*Zygadenus gramineus* Rydb., *Z. intermedius* Rydb.), Wyoming; Alberta.
Toxicoscordion venenosum (S. Wats.) Rydb. (*Zygadenus venenosus* S. Wats.), Montana, Washington, Wyoming.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 2, f. 34.*

Add the exsiccati: Barth. N. Am. Ured. *1798, 3297;* Garrett, Fungi Utah. *250.*

241. **Nigredo aemula.**

Add the exsiccati: Barth. N. Am. Ured. *3085.*

241. **Nigredo bicolor.**

Omit the first host.

Add the host: *Allium* sp., Maine.

Add the exsiccati: Barth. N. Am. Ured. *1685;* Thaxter, Rel. Farl. *290a, b.*

242. **Nigredo Lilii.**

Reduce this name to synonymy, and substitute: **Nigredo Holwayi** (Lagerh.) Arthur.

Insert after the first synonym: Not *U. Lilii* J. Kunze, 1873.

Omit *Lilium pardalinum* from the hosts; the material on which the record was made is found to be *L. columbianum*. To this latter name should be added as a synonym: (*L. parviflorum* Holz.).

Change the type locality to read: Ann. Arbor, Michigan, on *Lilium superbum*.

Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 9, f. 4.*

Add the exsiccati: Barth. N. Am. Ured. *889, 1289, 1387, 2190;* Ellis, N. Am. Fungi *228.*

242. Insert:

40a. **Nigredo affinis** (Wint.) Arthur.

Uromyces affinis Wint. Hedwigia **24**: 259. 1885.
Caeomurus affinis Kuntze, Rev. Gen. **3**[3]: 449. 1898.
Doassansia Hypoxidis Bres. in Rab.-Paz. Fungi Eur. *4201.* 1901.
Uredo Hypoxidis P. Henn. Hedwigia Beibl. **40**: 173. 1901.
Uromycopsis affinis Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Uredo globulosa Arth. Mycologia **8**: 22. 1916.

O. Pycnia unknown.

I. Aecia amphigenous, numerous, in more or less elongate groups, short-cylindric or cupulate, 0.2–0.6 mm. in diameter; peridium white, becoming brownish-yellow, erect, about 0.2 mm. high, the margin incised; peridial cells rectangular, 19–24 by 32–35 μ, somewhat overlapping, the walls about 7–10 μ thick, the outer wall transversely striate, smooth, the inner wall finely verrucose; aeciospores angularly globoid or broadly ellipsoid, 15–21 by 19–24 μ; wall colorless or slightly yellowish, 1–2 μ thick, minutely and closely verrucose.

II. Uredinia chiefly hypophyllous, scattered or aggregate, on well-defined purplish-black spots 0.5–1 mm. across, bullate, tardily opening by a central pore; urediniospores globoid, broadly ellipsoid, or obovoid, 15–19 by 18–26 μ; wall light cinnamon-brown or nearly colorless, moderately thin, about 1.5 μ thick, finely and closely echinulate, the pores usually indistinct, 3, slightly superequatorial.

III. Telia amphigenous, scattered or aggregate, sometimes coalescing, round or oblong, 0.2–0.6 mm. in length, bullate, tardily naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores oblong or obovate, often irregular, 14–20 by 22–32 μ, rounded or obtuse at both ends; wall cinnamon-brown, moderately thin, 1.5–2 μ, thickened above by a semi-hyaline umbo, 4–5 μ, smooth; pedicel fragile, colorless, once or once and a half length of spore, usually broken away.

ON AMARYLLIDACEAE:
Hypoxis decumbens L., Oaxaca; Porto Rico.
Hypoxis hirsuta (L.) Coville (*H. erecta* L.), Connecticut, Mississippi, Missouri, New York.
Hypoxis juncea Smith, Florida.

TYPE LOCALITY: Perryville, Missouri, on *Hypoxis erecta.*

DISTRIBUTION: Local from Connecticut and Missouri southward through Mexico and the West Indies; also in South America.

ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 582. *f. 87.*

EXSICCATI: Barth. N. Am. Ured. *1683;* Ellis & Ev. N. Am. Fungi *1868;* Rab.-Wint. Fungi Eur. *3307.*

242. **Nigredo houstoniata.**

Add the host, under Rubiaceae: *Houstonia longifolia* Gaertn. (*H. purpurea longifolia* A. Gray), New York, Pennsylvania, West Virginia, Wisconsin; Saskatchewan.

Add the exsiccati: Barth. N. Am. Ured. *3090;* Ellis & Ev. Fungi Columb. *497, 1078;* Thaxter, Rel. Farl. *292.*

243. Insert:

42a. **Nigredo ornatipes** Arthur.

Uromyces ornatipes Arth. Bull. Torrey Club **42**: 586. 1915.

O. Pycnia unknown.

I. Aecia scattered about the slightly swollen but not discolored stem for 5–10 mm. in length, cylindric, 0.5–0.8 mm. high; peridium colorless, delicate, the margin erect,

erose or lacerate; peridial cells rhomboidal, 18–21 by 26–32 μ, overlapping, the outer wall 3–4 μ thick, smooth, the inner wall 5–7 μ thick, verrucose; aeciospores angularly globoid or ellipsoid, 18–23 by 24–27 μ; wall colorless, 1.5–2 μ thick, sometimes with appearance of being thicker, very inconspicuously verrucose.

II. Uredinia few, soon naked, round, 0.5 mm. or less in diameter, soon naked, chestnut-brown, pulverulent, ruptured epidermis noticeable; urediniospores ellipsoid, 21–24 by 26–33 μ; wall golden-brown, 1.5–2.5 μ thick, sparsely verrucose, the pores obscure, apparently 4 and equatorial.

III. Telia associated with aecia, rising somewhat above surface of host, soon naked, round, 0.3–0.5 mm. in diameter, blackish-brown; teliospores ellipsoid, 21–26 by 27–32 μ, rounded above and below; wall dark chocolate-brown, often opaque, 2–2.5 μ thick, thicker above, 5–7 μ, longitudinally rugose, appearing indistinctly striate when wet; pedicel colorless, joined to the spore by a tinted collar, solid, smooth, 7–9 μ in diameter above, increasing to 10–13 μ in diameter in lower part, transversely rugose, once to twice length of spore.

ON LORANTHACEAE:
Phrygilanthus Sonorae (S. Wats.) Rose & Daniels (*Loranthus Sonorae* S. Wats.), Lower California.
TYPE LOCALITY: Cape San Lucas, Lower California, Mexico, on *Phrygilanthus Sonorae*.
DISTRIBUTION: Known only from the type locality.

42b. **Nigredo socia** (Arth. & Holway) Arthur.

Uromyces socius Arth. & Holway, Am. Jour. Bot. **5**: 437. 1918.

O. Pycnia unknown.

I. Aecia chiefly hypophyllous, crowded upon distended bladder-like areas 3–20 mm. across, short-cylindric, 0.4–0.8 mm. in diameter, about 0.4 mm. high; peridium erect, the margin erose; peridial cells rectangular or rhombic in side view, 23–26 by 35–45 μ, abutted or slightly overlapping, the outer wall 4–8 μ thick, transversely striate, smooth, the inner wall 7–10 μ thick, coarsely verrucose; aeciospores ellipsoid or oblong, 23–27 by 26–35 μ; wall colorless, 2–3 μ thick, closely and finely verrucose.

II. Uredinia mostly hypophyllous, crowded in small circinating groups 1–4 mm. across, early naked, cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores fusiform or fusiform-ellipsoid, 16–26 by 37–55 μ; wall golden-brown, 1.5–2.5 μ thick, moderately echinulate, the pores distinct, 4, equatorial.

III. Telia amphigenous, crowded in small circinating groups 1–4 mm. across, ellipsoid or oblong, 0.3–0.8 mm. long, compact, blackish, ruptured epidermis conspicuous; teliospores ellipsoid, obovoid, or oblong-obovoid, 18–24 by 29–35 μ, rounded at both ends or somewhat narrowed below; wall dark chestnut-brown, 2–3 μ thick, thicker above, 5–9 μ, longitudinally verrucose-rugose in more or less broken lines 1–3 μ apart; pedicel colorless, verrucosely roughened, as long as spore.

ON LORANTHACEAE:
Loranthus crassipes Oliver, Guatemala.
Struthanthus densiflorus (Benth.) Mart., Guatemala.
TYPE LOCALITY: Antigua, Sacatépequez, Guatemala, on *Loranthus* sp.
DISTRIBUTION: Guatemala.

42c. **Nigredo** (?) **euphlebia** (Sydow) Arthur.

Uromyces euphlebius Sydow, Ann. Myc. **18**: 154. 1920.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous, in orbicular groups 2–4 mm. across, often concentric, irregularly roundish or oblong, large, 0.5–1 mm. in shortest diameter, often uniting to form circles, tardily naked, cinnamon-brown, somewhat pulverulent, ruptured epidermis overarching; urediniospores ellipsoid or oblong-ellipsoid, 20–25 by 35–50 μ; wall golden-brown, 2–3 μ thick, moderately echinulate, the pores 4, equatorial.

III. Telia similar to the uredinia, dark chocolate-brown; teliospores irregularly oblong, 19–23 by 34–50 μ; wall chestnut-brown, 2–2.5 μ thick, paler and thicker above, 7–10 μ, longitudinally striate, the striae 3 μ apart and usually continuous and distinct: pedicel colorless, half length of spore or broken away.

ON LORANTHACEAE:
Phoradendron sp., Jalisco.
TYPE LOCALITY: Chapala, Mexico, on *Phoradendron* sp.
DISTRIBUTION: Known only from the type locality.

243. **Nigredo Polygoni.**

The citation for *Uromyces Polygoni* Fuckel should read: Jahrb. Nass. Ver. Nat. **23–24**: 64. 1870.

Add the synonyms: *Uredo flexuosa* Strauss, Ann. Wett. Ges. **2**: 96. 1810. *Aecidium Avicullariae* Kunze, in Ficinus, Fl. Dresd. **2**: 129. 1823. *Aecidium rubellatum Avicullariae* Rab. Deutschl. Krypt.-Fl. **1**: 16. 1844. *Uredo longipes* Lasch, in Klotzsch, Herb. Myc. *893*. 1846. *Uredo clavigera* Lasch, in Klotzsch, Herb. Myc. *1295*. 1849. *Uromyces Polygoni-avicularis* Ramsb. Trans. Brit. Myc. Soc. **4**: 335. 1914.

Add the host: *Polygonum neglectum* Besser, Alaska.

Add the illustrations: Ann. Wett. Ges. **2**: *pl. 11, f. 14;* Grove, Brit. Rust Fungi *f. 69;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 22;* Fl. Ibér. Ured. **2**: *f. 16.*

Omit from the exsiccati: Rab.-Wint. Fungi Eur. *3628a.*

Add the exsiccati: Barth. Fungi Columb. *3097, 4193, 4498, 4499, 4792, 4894;* Barth. N. Am. Ured. *394, 494, 894, 991, 1095, 1196, 1295, 1792, 2195, 2295, 2296, 2394, 2497, 2996, 3390, 3391;* Brenckle, Fungi Dak. *133, 133a;* Garrett, Fungi Utah. *245.*

244. Insert:

43a. **Nigredo Rickeriana** Arthur.

Uromyces Rickerianus Arth. Bull. Torrey Club **29**: 227. 1902.
Uromycopsis Rickerianus Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Uromyces fuscatus Arth. Bull. Torrey Club **45**: 142. 1918.
Pucciniola Rickerianus Arth. N. Am. Flora **7**: 443. 1921.

O. Pycnia unknown.

I. Aecia amphigenous, in dense groups 3–5 mm. across, short-cylindric or cupulate, small, 0.2–0.3 mm. in diameter; peridium colorless, the margin erect or somewhat recurved, coarsely and deeply lacerate; peridial cells rhomboidal, 13–19 by 28–37 μ, considerably overlapping, the outer wall 7–9 μ thick, finely transversely striate, smooth, the inner wall 2.5–3.5 μ thick, moderately verrucose; aeciospores globoid, 16–22 μ in diameter; wall colorless, 1–1.5 μ thick, finely and closely verrucose, often appearing smooth when wet.

II. Uredinia amphigenous, scattered, round, 0.3–0.8 mm. across, elevated, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly ellipsoid, 18–24 by 22–29 μ; wall cinnamon-brown, 2–3 μ thick, closely and finely verrucose, the pores 3 or 4, approximately equatorial.

III. Telia amphigenous, scattered, round or irregular, 0.5–2 mm. across, often confluent, early naked, prominent, dark chestnut-brown, ruptured epidermis evident; teliospores globoid or broadly ellipsoid, 18–23 by 23–28 μ, rounded at both ends; wall chestnut-brown, 2–2.5 μ thick, slightly thicker above, 3–5 μ, moderately verrucose in longitudinal lines; pedicel colorless, as long as spore, fragile, usually broken off short.

ON POLYGONACEAE:
Rumex paucifolius Nutt. (*R. Geyeri* Trel.), Idaho, Utah.
TYPE LOCALITY: Teton Pass, Wyoming, on *Rumex Geyeri.*
DISTRIBUTION: Idaho to northern Utah.
EXSICCATI: Barth. N. Am. Ured. *3296;* Garrett, Fungi Utah. *244.*

244. **Nigredo intricata.**

Add the hosts:

Eriogonum biumbellatum Rydb., Utah.
Eriogonum divergens Small, Arizona.
Eriogonum gracile Benth., California.
Eriogonum Jamesii Benth., New Mexico.
Eriogonum ovalifolium Nutt., Wyoming.
Eriogonum Piperi Greene, Idaho, Montana.
Eriogonum proliferum T. & G., Nevada.
Eriogonum saxatile S. Wats., California.
Eriogonum sulphureum Greene, Oregon.
Eriogonum ursinum S. Wats., California.
Eriogonum Wrightii Torr., Arizona, California.
Oxytheca dendroidea Nutt., California.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 8, f. 117, 118.*

Add the exsiccati: Barth. Fungi Columb. *3790, 4790, 4893;* Barth. N. Am. Ured. *487, 682, 683, 785, 890, 1093, 1290, 1388, 1389, 1594, 1695, 1696, 1890, 1891, 1988, 3091, 3189, 3287, 3387, 3388;* Brenckle, Fungi Dak. *406;* Ellis & Ev. Fungi Columb. *480b, 650.*

245. **Nigredo Betae.**

Add the host: *Beta cicla* L., California.

Add the illustrations: E. & P. Nat. Pfl. **1**^{1**}: *f. 37 C, D;* Grove, Brit. Rust Fungi *f. 65;* Fl. Ibér. Ured. **2**: *f. 15.*

Add the exsiccati: Barth. Fungi Columb. *4886;* Barth. N. Am. Ured. *1285, 2089.*

245. Insert:

45a. **Nigredo Chenopodii-fruticosi** (DC.) Arthur.

Aecidium Chenopodii-fruticosi DC. Fl. Fr. **6**: 92. 1815.
Caeoma chenopodiatum Link, in Willd. Sp. Pl. **6**^{2}: 45. 1825.
Uredo Chenopodii Spreng. Syst. Veg. **4**: 574. 1827.
Aecidium Schoberiae Auersw. in Willkomm, Fl. Hisp. 537. 1852.
Uromyces giganteus Speg. Dec. Myc. Ital. *30.* 1879.
Uromyces giganteus erythraeus Trotter, Ann. Myc. **2**: 360. 1880.
Aecidium Suaedae Thüm. Flora **63**: 479. 1880.
Uromyces Chenopodii Schroet. in Kunze, Fungi Sel. *214.* 1880.
Uromyces Suaedae Jacz. Bull. Soc. Myc. Fr. **9**: 47. 1893.
Capitularia Chenopodii Sydow, Ann. Myc. **20**: 123. 1922.

O. Pycnia amphigenous, numerous, gregarious, prominent, honey-yellow, in section globoid or flask-shaped, 125–190 μ broad by 160–190 μ high; ostiolar filaments united into a short column.

I. Aecia amphigenous, surrounding the pycnia in groups 2–3 mm. across, cupulate, 0.2–0.3 mm. in diameter; peridium colorless or yellowish, the margin lacerate; peridial cells rhomboidal, 20–24 by 30–34 μ, slightly overlapping, the outer wall 10–14 μ thick, transversely striate, smooth, the inner wall much thinner, 2–2.5 μ, finely verrucose; aeciospores broadly ellipsoid, 18–20 by 24–27 μ; wall colorless, thin, 1–1.5 μ, minutely and inconspicuously verrucose.

II. Uredinia amphigenous and caulescent, numerous, scattered or gregarious, sometimes crowded or confluent over large areas, roundish, 0.3–0.8 mm. in diameter or larger on stems, early naked, chestnut-brown, pulverulent, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 18–22 by 26–32 μ; wall cinnamon-brown, 1.5–2.5 μ thick, finely and moderately echinulate, the pores obscure, apparently 6–8, scattered.

III. Telia on the leaves distributed like the uredinia, on the stems often producing fusiform swellings, elongate, large, 5–30 mm. long, pulvinate, blackish-brown; teliospores globoid or obovoid, 23–26 by 27–35 μ, rounded above, rounded or somewhat narrowed below; wall chestnut-brown, thin, 1.5–2 μ, thicker above, 3–6 μ, smooth; pedicel colorless, persistent, twice length of spore or longer.

ON CHENOPODIACEAE:
Dondia brevifolia Standley, California.
Dondia californica (S. Wats.) A. Heller (*Suaeda californica* S. Wats.), California.
Dondia occidentalis (S. Wats.) A. Heller (*Schoberia occidentalis* S. Wats.), Arizona, Idaho.
Dondia ramosissima Standley, California.
Dondia suffrutescens (S. Wats.) A. Heller (*Suaeda suffrutescens* S. Wats.), Texas.
Dondia taxifolia Standley, California.
Dondia Torreyana (S. Wats.) Standley (*Suaeda Torreyana* S. Wats.), California, Wyoming.

TYPE LOCALITY: Montpellier, France, on *Chenopodium fruticosum.*

DISTRIBUTION: Wyoming to northern Idaho, southward to western Texas and southern California; also in Europe and northern Africa.

ILLUSTRATIONS: Grove, Brit. Rust Fungi *f. 64;* Bull. Soc. Myc. Fr. **9**: *pl. 3, f. 5;* Ann. Myc. **2**: 359, 360; Fl. Ibér. Ured. **2**: *f. 13, 14.*

EXSICCATI: Barth. Fungi Columb. *4090;* Barth. N. Am. Ured. *883, 1688, 1887.*

246. **Nigredo** (?) **Celosiae.**

Replace list of hosts by:

Iresine Calea (Ibáñez) Standley (*I. latifolia* Benth. & Hook.), Oaxaca, Pueblo; Costa Rica; Guatemala.
Iresine Celosia L. (*I. canescens* Humb. & Bonpl., *I. paniculata* Kuntze, not Poir., *Celosia paniculata* L.), Morelos; Cuba; Porto Rico; Jamaica.

Omit the host: *Iresine Pringlei*, an erroneous determination.

Add the exsiccati: Barth. Fungi Columb. *4889;* Barth. N. Am. Ured. *1488.*

246. **Nigredo caryophyllina.**

Add the synonym: *Uromyces sinensis* Speg. Dec. Myc. Ital. *69.* 1879.

Add the illustrations: Verh. Nat. Ver. Brünn **10**[2]: *pl. 3, f. 9;* Grove, Brit. Rust Fungi *f. 61;* Ann. Rep. N. J. Exp. Sta. **13**: 279. *f. 1;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 19;* Fl. Ibér. Ured. **2**: *f. 47, 48.*

Add the exsiccati: Barth. N. Am. Ured. *287, 1588, 3380, 3489;* Thaxter, Rel. Farl. *291.*

247. Insert:

47a. **Nigredo verruculosa** (Schroet.) Arth. Bull. Torrey Club **51**: 59. 1924.

Uredo Lychnidis Schroet. Abh. Schles. Ges. **48**: 30, hyponym. 1870.
Uromyces verruculosus Schroet. Jahresb. Schles. Ges. **50**: 140. 1873.
Uromyces Schroeterii De-Toni, in Sacc. Syll. Fung. **7**: 551. 1888.
Uromyces Lychnidis Lagerh. Bol. Soc. Brot. **8**: 7. 1890.

O and I. Pycnia and aecia unknown; but probably occurring on *Euphorbia* sp.

II. Uredinia hypophyllous, scattered or sometimes aggregate, round, 0.3–0.6 mm. in diameter, early naked, cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 18–22 by 19–26 μ; wall cinnamon-brown, 1.5–2 μ thick, closely echinulate, the pores 3–5, scattered, usually in upper part of spore or sometimes equatorial.

III. Telia sparingly produced, scattered or in small groups, small, soon naked, blackish-brown, pulverulent; teliospores globoid or broadly obovoid, 17–22 by 18–25 μ; wall dark chestnut-brown, slightly thickened at apex by a small papilla, minutely reticulate-verrucose; pedicel colorless, fragile, deciduous.

ON CARYOPHYLLACEAE:
Lychnis alba Mill. (*Melandrium album* Garcke), Michigan, New York.
TYPE LOCALITY: Silesia, on *Melandrium album.*
DISTRIBUTION: Northern part of the southern peninsula of Michigan; also in Europe.

247. **Nigredo Silenes.**

The citation for *Uromyces Silenes* Fuckel should read: Jahrb. Nass. Ver. Nat. **23–24**: 61. 1870.

Add the synonym: *Capitularia inaequialta* Sydow, Ann. Myc. **20**: 123. 1922.

Add the hosts:

Arenaria glabrescens (S. Wats.) Howell, Utah.
Silene Douglasii Hook., California.
Silene Lemmonii S. Wats., California.
Silene noctiflora L., Pennsylvania.
Silene occidentalis S. Wats., California.

Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 21.*

247. Insert:

48a. **Nigredo Suksdorfii** (Dietel & Holway) Arth. Bull. Torrey Club **51**: 58. 1924.

Uromyces Suksdorfii Dietel & Holway; Dietel, Erythea **3**: 77. My 1895.
Uromyces Lychnidis Tracy & Earle; M. E. Jones, Proc. Calif. Acad. II. **5**: 729. O 1895. Not *U. Lychnidis* Lagerh. 1890.
Uromycopsis Lychnidis Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Uromycopsis Suksdorfii Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Uromyces Betheli Arth. Bull. Torrey Club **51**: 58. 1924.
Puccíniola Betheli Arth. Bull. Torrey Club **51**: 59. 1924.

O. Pycnia unknown.

I. Aecia hypophyllous, irregularly grouped, usually on discolored spots, cupulate, 0.1–0.4 mm. in diameter; peridium colorless or pale-yellow, the margin lacerate, recurved; peridial cells rhomboidal, 13–18 by 19–30 μ, somewhat overlapping, the outer wall 7–9 μ thick, transversely striate, smooth, the inner wall much thinner, 2–3 μ, evenly verrucose; aeciospores angularly globoid, 13–18 by 19–24 μ; wall colorless, 1.5 μ thick, inconspicuously verrucose.

II. Uredinia chiefly epiphyllous, few, scattered, early naked, compact, golden-yellow, ruptured epidermis inconspicuous; urediniospores globoid, 18–23 by 19–26 μ; wall golden-yellow, 1.5–2 μ thick, very closely and evenly verrucose, the pores 3 or 4, approximately equatorial.

III. Telia chiefly epiphyllous, numerous, scattered, roundish, 0.2–0.8 mm. across, rather tardily naked, blackish-brown, pulverulent, ruptured epidermis conspicuous; teliospores broadly ellipsoid or obovoid, 18–24 by 23–32 μ; wall cinnamon- or chestnut-brown, 3–3.5 μ thick, slightly thicker above, 4–6 μ, rather coarsely verrucose in close longitudinal lines; pedicel slightly tinted, shorter than the spore, fragile.

ON CARYOPHYLLACEAE:
Silene Hallii S. Wats., Colorado, New Mexico.
Silene occidentalis S. Wats., California.
Silene oregana S. Wats., Idaho, Washington.
Silene Scouleri Hook., Washington.
Silene verecunda S. Wats., California.
Wahlbergella Drummondii (Hook.) Rydb. (*Silene Drummondii* Hook., *Lychnis Drummondii* S. Wats.), Utah.
TYPE LOCALITY: West Klickitat County, Washington, on *Silene oregana*.
DISTRIBUTION: Northern New Mexico to southern Washington.
ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 7, f. 109*.
EXSICCATI: Sydow, Ured. *1860*.

48b. **Nigredo bifrons** (DC.) Arthur.

Aecidium bifrons DC. Fl. Fr. **2**: 246. 1805.
Uromyces Aconiti Fuckel. Jahrb. Nass. Ver. Nat. **23–24**: 61. 1870.
Uromyces Aconiti-Lycoctoni Wint. in Rab. Krypt.-Fl. **1**[1]: 153. 1881.
Caeomurus bifrons Kuntze, Rev. Gen. **3**[3]: 449. 1898.
Uromycopsis Aconiti-Lycoctoni Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.

O. Pycnia amphigenous, numerous, in groups 1–2 mm. across, conspicuous, flattened-globoid, 95–110 μ broad by 65–80 μ high; ostiolar filaments about 50 μ long, only slightly projecting above the ostiole.

I. Aecia hypophyllous, crowded in groups 2–7 mm. across, cupulate, 0.2–0.3 mm. in diameter; peridium pale-yellow, the margin recurved, erose; peridial cells rhomboidal, 16–23 by 26–35 μ, overlapping, the outer wall 9–11 μ thick, transversely striate, smooth, the inner wall much thinner, 4–5 μ, closely and rather coarsely verrucose; aeciospores angularly ellipsoid, 16–21 by 23–34 μ; wall colorless, 1.5–2 μ thick, closely and finely verrucose.

II. Uredinia not seen, rarely produced; urediniospores in the telial sori ellipsoid or globoid, 17–23 by 22–29 μ; wall pale-yellow or nearly colorless, 1–2 μ thick, minutely and striately verrucose, the pores obscure.

III. Telia epiphyllous, numerous, scattered or in irregular groups of considerable size, roundish, 0.2–0.5 mm. in diameter, tardily naked, chocolate-brown, pulverulent, ruptured epidermis noticeable; teliospores broadly ellipsoid or obovoid, 18–27 by 23–35 μ; wall cinnamon-brown, 1.5–2 μ thick, thicker above, 3–4 μ, smooth; pedicel colorless, once length of spore or less, fragile.

ON RANUNCULACEAE:
Aconitum columbianum Nutt., California, Colorado, Utah, Wyoming.
TYPE LOCALITY: Jura, France, on *Aconitum Lycoctonum*.
DISTRIBUTION: Central Colorado to northern California.
ILLUSTRATION: Beitr. Krypt. Schweiz **2**[2]: *f. 13;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 18;* Fl. Ibér. Ured. **2**: *f. 51*.
EXSICCATI: Barth. N. Am. Ured. *85;* Ellis & Ev. Fungi Columb. *1892;* Ellis & Ev. N. Am. Fungi *2212, 2410;* Sydow, Ured. *1751, 1901*.

247. **Nigredo Lespedezae-procumbentis.**

Add the synonyms: *Uromyces macrosporus* Berk. & Curt.; Peck, Ann. Rep. N. Y. State Mus. **23**: 58, hyponym. 1872. *Trichobasis macrospora* Berk. & Curt.; Thüm. Myc. Univ. *1528*, as synonym. 1880.

Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 7, f. 10–14*.

Add the exsiccati: Barth. Fungi Columb. *3994, 4697;* Barth. N. Am. Ured. *490, 491, 792, 891, 892, 990, 1892, 2193, 2291, 2292, 2391, 2392, 2494, 2495, 2590, 2591, 2592, 2593, 2793, 2794, 2890, 2891, 2993, 3094, 3095, 3190, 3289, 3290;* Ellis & Ev. Fungi Columb. *59, 255;* Thaxter, Rel. Farl. *296*.

248. **Nigredo Hedysari-paniculati.**

Omit the synonym: *Aecidium Desmodii* P. Henn.

Omit from the hosts: *Meibomia* sp.; also "Mexico (state)" after *M. elegans*.

Add the hosts:

Meibomia angustifolia (H.B.K.) Kuntze (*Desmodium angustifolium* DC.), Guatemala.
Meibomia axillaris (Sw.) Kuntze (*Desmodium axillare* DC.), Porto Rico.
Meibomia Barclayi (Benth.) Rose & Standley (*Desmodium Barclayi* Benth.), Salvador.
Meibomia callilepis (Hemsl.) Kuntze (*Desmodium callilepis* Hemsl.), Mexico (state).
Meibomia Conzattii (Greenm.) Standley (*Desmodium Conzattii* Greenm.), Oaxaca.
Meibomia Ghiesbreghtii (Hemsl.) Kuntze (*Desmodium Giesbreghtii* Hemsl.), Oaxaca.
Meibomia jaliscana (S. Wats.) Standley (*Desmodium jaliscanum* S. Wats.), Michoacán.
Meibomia longifolia (T. & G.) Vail (*Desmodium longifolium* Nutt.), Mississippi.
Meibomia orbicularis (Schlecht.) Kuntze (*Desmodium orbiculare* Schlecht.), Guatemala.
Meibomia prehensilis (Schlecht.) Kuntze (*Desmodium prehensile* Schlecht.), Morelos.
Meibomia purpurea (Mill.) Vail (*Desmodium tortuosum* Auth.), Jalisco; Cuba; Porto Rico.
Meibomia rhombifolia (Ell.) Vail (*Desmodium rhombifolium* DC.), Alabama, Georgia.
Meibomia Scorpiurus (Sw.) Kuntze (*Desmodium Scorpiurus* Desv.), Florida; Guatemala; Salvador; Panama; Cuba; Porto Rico.
Meibomia tenuipes Blake, Guatemala.
Meibomia umbrosa Britton, Porto Rico.
Meibomia uncinata (DC.) Kuntze (*Desmodium uncinatum* DC.), Mexico (state), Oaxaca.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 63.*

Add the exsiccati: Barth. Fungi Columb. *4189, 4297, 4298, 4592, 4692, 4693, 4789;* Barth. N. Am. Ured. *386, 687, 988, 989, 1192, 1193, 1194, 1690, 1787, 2093, 2094, 2189, 2287, 2288, 2386, 2387, 2489, 2490, 2585, 2586, 2587, 2790, 2791, 2792, 2883, 2884, 2885, 2886, 2887, 2990, 2991, 3184, 3185, 3283, 3284, 3384, 3491.*

250. **Nigredo mexicana.**

Omit the host, "*Meibomia* sp.," and add:

Meibomia hirsuta (Mart. & Gal.) Kuntze (*Desmodium hirsutum* Mart. & Gal.), Morelos.
Meibomia procumbens (Mill.) Britton (*Desmodium spiralis* Auth.), Hidalgo, Jalisco, Mexico (state), San Luis Potosí.
Meibomia uncinata (DC.) Kuntze (*Desmodium uncinatum* DC.), Costa Rica.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 66.* EXSICCATI: Barth. N. Am. Ured. *692.*

250. **Nigredo Indigoferae.**

Add the host: *Indigofera miniata* Ortega, Florida.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 69.* EXSICCATI: Barth. N. Am. Ured. *3188.*

251. **Nigredo Fabae.**

The citation for *Uromyces Viciae* Fuckel should read: Jahrb. Nass. Ver. Nat. **23–24**: 62. 1870.

Add the hosts:

Lathyrus Nuttallii S. Wats., Oregon.
Lathyrus obovatus (Torr.) T. G. White, Oregon, Washington.
Lathyrus palustris L., Michigan, Washington, Wisconsin.
Pisum sativum L., Minnesota; Manitoba.
Vicia angustifolia L., British Columbia.
Vicia californica Greene, California.
Vicia caroliniana Walt., Wisconsin.
Vicia melilotoides Wooton & Standley, Arizona.
Vicia oregana Nutt., Alberta.
Vicia sativa L., Montana, Washington.
Vicia truncata Nutt., Oregon.

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 42b;* Grove, Brit. Rust Fungi *f. 49–52;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 4–11;* Fl. Ibér. Ured. **2**: *f. 31.*

Add the exsiccati: Barth. Fungi Columb. *4092, 4494;* Barth. N. Am. Ured. *289, 592, 593, 684, 786, 787, 788, 886, 986, 1287, 2788, 3282, 3382, 3383;* Brenckle, Fungi Dak. *372.*

252. **Nigredo Lupini.**

Omit from the hosts: *Lupinus mexicanus* and *L. uncinatus*, the latter being erroneously determined and both belonging under *Pucciniola montana* Arth., page 446.

Add the hosts:

Lupinus aduncus Greene, Colorado.
Lupinus amplus Greene, Colorado.
Lupinus Bridgesii (S. Wats.) Greene, California.
Lupinus leucophyllus Dougl., Washington.
Lupinus Suksdorfii B. L. Robinson, Washington.
Lupinus sulphureus Dougl., Washington.

Omit from the exsiccati: Sydow, Ured. *1961*, which belongs under *Pucciniola montana*.

Add the exsiccati: Barth. N. Am. Ured. *293*, *393*, *492*, *690*, *691*, *1293*, *1392*, *1393*, *1596*, *1993*; Ellis & Ev. Fungi Columb. *1180*.

252. **Nigredo occidentalis.**

Substitute for the line pertaining to pycnia and aecia:

O. Pycnia chiefly hypophyllous, sparsely scattered over surface of leaf, punctiform, honey-yellow becoming brownish, noticeable, in section globoid or flask-shaped, 110–150 μ broad; ostiolar filaments agglutinate into a short column.

I. Aecia hypophyllous, evenly scattered over surface of leaf, short-cylindric; peridium colorless, the margin erect or slightly recurved, irregularly lacerate; peridial cells rhomboidal, 12–18 by 18–26 μ, slightly overlapping, the outer wall 7–10 μ thick, transversely striate, smooth, the inner wall 2–3 μ thick, verrucose; aeciospores angularly globoid or ellipsoid, 16–20 by 20–24 μ; wall colorless, 1.5–2 μ thick, finely verrucose.

ON EUPHORBIACEAE:
Tithymalus chamaesula (Boiss.) Wooton & Standley (*Euphorbia chamaesula* Boiss.), New Mexico.
Tithymalus luridus (Engelm.) Wooton & Standley (*Euphorbia lurida* Engelm.), New Mexico.
Tithymalus robustus (Engelm.) Small (*Euphorbia robusta* Engelm.), Arizona, Colorado, Montana, Nevada, Utah.

In the description of the teliospores change the dimensions to read "15–22 by 19–30 μ."

Add the hosts, under Fabaceae:

Lupinus ammophilus Greene, New Mexico.
Lupinus arboreus Sims, California.
Lupinus argenteus Pursh, Colorado.
Lupinus Bakeri Greene, Colorado.
Lupinus caespitosus Nutt., Colorado.
Lupinus Palmeri S. Wats., Arizona.
Lupinus pusillus Pursh, Colorado.

Add the exsiccati: Barth. Fungi Columb. *4094*; Barth. N. Am. Ured. *795*, *1395*, *2194*; Clements, Crypt. Form. Colo. *594*; Ellis & Ev. N. Am. Fungi *2215*.

253. **Nigredo substriata.**

Add the hosts:

Lupinus aduncus Greene, New Mexico.
Lupinus Palmeri S. Wats., Arizona.

Add the exsiccati: Barth. Fungi Columb. *3793*; Barth. N. Am. Ured. *1000*, *1700*.

253. **Nigredo punctata.**

Add the hosts:

Aragallus deflexus (Pall.) A. Heller (*Oxytropis deflexa* DC.), New Mexico.
Aragallus podocarpus (A. Gray) Greene (*Oxytropis podocarpa* A. Gray), Idaho.
Aragallus spicatus (Hook.) Rydb. (*Oxytropis campestris spicata* Hook.), Montana.
Astragalus aboriginorum Richards. (*Atelophragma aboriginum* Rydb.), Montana.
Astragalus caespitosus A. Gray (*Homalobus caespitosus* Nutt.), North Dakota.
Astragalus flexuosus Dougl. (*Homalobus flexuosus* Rydb.), Colorado.
Astragalus goniatus Nutt. (*A. hypoglottis* Richards, not L.), Montana.
Astragalus guatemalensis Hemsl., Guatemala.
Astragalus Hosackiae Greene, Arizona.
Astragalus humistratus A. Gray (*Tium humistratum* Rydb.), Utah.
Astragalus leucophyllus T. & G., California.

Astragalus Lindheimeri Engelm. (*Hamosa Lindheimeri* Rydb.), Texas.
Astragalus Nuttallianus DC. (*Hamosa Nuttalliana* Rydb.), Texas.
Astragalus plattensis Nutt. (*Geoprumnon plattense* Rydb.), Nebraska.
Astragalus Sonorae A. Gray, Utah.
Astragalus tridactylicus A. Gray (*Orophaca tridactylica* Rydb.), Wyoming.
Astragalus triphyllus Pursh (*Orophaca caespitosa* Britton), Montana, North Dakota.
Astragalus Wootoni Sheldon, Arizona, New Mexico.
Kentrophyta impensa (Sheldon) Rydb. (*Astragalus viridis impensus* Sheldon), Utah.

Add the exsiccati: Barth. Fungi Columb. *3895*, *4793*, *4996*, *5096;* Barth. N. Am. Ured. *698*, *1189*, *1284*, *1599*, *1699*, *1795*, *1896*, *1897*, *1998*, *2097*, *2498*, *3195*, *3295;* Brenckle, Fungi Dak. *178*, *373*, *389;* Garrett, Fungi Utah. *249.*

254. Insert:

58a. **Nigredo** (?) **decorata** (Sydow) Arthur.

Uromyces decoratus Sydow, Ann. Myc. **5**: 491. 1907.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, scattered, roundish, 0.2–0.5 mm. in diameter, soon naked, applanate, cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 18–23 by 23–25 μ; wall light cinnamon-brown, 1.5–2 μ thick, sparsely and inconspicuously echinulate, the pores 4–6, scattered.

III. Telia similar to the uredinia, blackish; teliospores broadly ellipsoid or oblong, 14–20 by 20–28 μ, rounded or obtuse above, rounded or narrowed below; wall chestnut-brown, 1.5–2 μ thick, with hyaline papilla over pore at apex, striately verrucose; pedicel colorless, slender, fragile, as long as spore or shorter, partially deciduous.

ON FABACEAE:
Crotalaria vitellina Ker, Costa Rica.
TYPE LOCALITY: Samalkota, Madras, India, on *Crotalaria juncea.*
DISTRIBUTION: Vicinity of San José, Costa Rica; also in India.
ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 60.*

254. **Nigredo fallens.**

Replace the first line of the description by:

O. Pycnia amphigenous, chiefly hypophyllous, often on the midrib in groups 1–5 mm. long, noticeably whitish, becoming light-brown, globoid or pyriform, 90–110 μ in transverse diameter; ostiolar filaments up to 25 μ long.

I. Aecia hypophyllous, gregarious in small groups 1–8 mm. across, small; peridium whitish, margin erose; peridial cells rhombic, considerably overlapping, 19–23 μ broad by 27–34 μ long, the outer wall 5–7 μ thick, transversely striate, smooth, the inner wall 3–5 μ, verrucose; aeciospores globoid or broadly ellipsoid, 18–22 by 22–24 μ; wall colorless, 1–1.5 μ, closely and finely verrucose.

Insert: ILLUSTRATIONS: McAlpine, Rusts Austr. *pl. G, f. 32, pl. 17, f. 142;* Grove, Brit. Rust Fungi *f. 42;* Fl. Ibér. Ured. **2**: *f. 44.*

Add the exsiccati: Barth. Fungi Columb. *3692*, *3992*, *4187*, *4391*, *4788;* Barth. N. Am. Ured. *685*, *887*, *1091*, *1288*, *1489*, *1590*, *1888*, *2090*, *2187*, *2286*, *2385*, *2584*, *2789*, *2987*, *3181*, *3490;* Brenckle, Fungi Dak. *283.*

255. **Nigredo Trifolii.**

In the synonymy, for "*Uredo Trifolii* DC." read "*Uredo Trifolii* Hedw. f."

Add the synonyms: *Nigredo Hybridi* W. H. Davis, Proc. Iowa Acad. **24**: 472. 1917. *Uromyces Hybridi* W. H. Davis, Proc. Iowa Acad. **24**: 472. 1917. *Uromyces Trifolii-hybridi* Paul, Krypt.-Forsch. **1917**[2]: 50. 1917.

Add the host: *Trifolium megacephalum* Nutt., Washington.

Add the illustrations: E. & P. Nat. Pfl. **1**[1**]: *f. 36 E, F;* Mycologia **16**: 214. *f. 4; pl. 14;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 1;* Fl. Ibér. Ured. **2**: *f. 42.*

Omit from the exsiccati: Clements, Crypt. Form. Colo. *541*, which belongs to *Puccíniola nerviphila* (Grognot) Arth., page 448.

Add the exsiccati: Barth. Fungi Columb. *4197*, *4395*, *4396*, *4500*, *4597*, *4698*, *5097;* Barth. N. Am. Ured. *294*, *399*, *500*, *700*, *899*, *1199*, *1398*, *2290*, *2389*, *2399*, *2589*, *3286;* Brenckle, Fungi Dak. *375;* Ellis, N. Am. Fungi *244.*

256. **Nigredo Cologaniae.**

Add the host: *Cologania glabrior* Rose, Guatemala.

Add the exsiccati: Barth. N. Am. Ured. *591.*

256. **Nigredo Medicaginis.**

Add the synonyms: *Uromyces Loti* A. Blytt, Forh. Vid.-Selsk. Christ. **1896**[6]: 37. 1896. *Uromyces Euphorbiae-Corniculati* Jordi, Centr. Bakt. II. Abt. **11**: 791. 1904.

Add the hosts:

Hosackia argophylla A. Gray (*Lotus argophyllus* Greene), California.
Hosackia glabra Torr. (*Lotus glaber* Greene), California.
Hosackia Ornithopus Greene (*Lotus Ornithopus* Greene), California.

Add the illustrations: Beitr. Krypt. Schweiz **2**[2]: *f. 26;* Centr. Bakt. II. Abt. **11**: 792. *f. 9–14;* Fl. Ital. Crypt. Ured. *f. 46b;* Ber. Deuts. Bot. Ges. **25**: *pl. 9, f. 39–45;* Briosi & Cavara, Funghi Paras. *4;* Fl. Ibér. Ured. **2**: *f. 35, 36.*

Add the exsiccati: Barth. Fungi Columb. *3699;* Barth. N. Am. Ured. *398, 999, 1499, 2892, 3191, 3496.*

257. **Nigredo appendiculata.**

Omit the synonyms: *Uredo Pamparum* Speg., *U. Dolichi* Arth., both belonging under *Nigredo Dolicholi* Arth., page 258.

Add the synonyms: *Aecidium Phaseoli* Funck, Crypt. Gew. Ficht. **20**: 4. 1814. *Uromyces Vignae* Barclay, Jour. As. Soc. Bengal **60**[2]: 211. 1891. *Uromyces aberrans* Dietel, Bot. Jahrb. **28**: 281. 1901. *Uromyces Fatouae* P. Henn. Hedwigia Beibl. **41**: 18. 1902. *Uromyces Vignae-luteolae* P. Henn. in DeWild. Ét. Fl. Bas-Congo **2**: 89. 1907. *Nigredo Vignae* Fromme, Phytopathology **14**: 72. 1924.

Add to the description of the urediniospore-pores: " or superequatorial (*Strophostyles, Vigna*)."

Omit from the hosts: *Dolichos reticulatus* Hochst., error for *Dolicholus reticulatus,* which belongs under *Nigredo Dolicholi* Arth., page 258; also omit *Vigna strobilophora* B. L. Robinson; and add to *Vigna sinensis* (L.) Endl., as synonyms: (*V. Catjang* Endl., *V. unguiculata* Walp., *Dolichos melanophthalmus* DC.).

Add the hosts:

Phaseolus lathyroides L., Porto Rico.
Phaseolus truxillensis H.B.K., Costa Rica.
Strophostyles umbellata (Muhl.) Britton (*Phaseolus helvolus* T. & G. not L.), Delaware, Florida, Indiana, Pennsylvania.
Vigna vexillata (L.) A. Rich., Cuba; Porto Rico.

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 42a;* Grove, Brit. Rust Fungi *f. 55;* E. & P. Nat. Pfl. **1**[1**]: *f. 37A, B;* Jour. As. Soc. Bengal **60**[2]: *pl. 5, f. 19;* Phytopathology **14**: 70. *f. 1; pl. 1;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 7, f. 16, 17;* Fl. Ibér. Ured. **2**: *f. 39.*

Add the exsiccati: Barth. Fungi Columb. *3691, 4590, 4591, 4991;* Barth. N. Am. Ured. *285, 381, 486, 587, 679, 680, 1188, 1283, 1784, 2086, 2087, 2088, 2185, 2186, 2285, 2384, 2482, 2483, 2581, 2582, 2583, 2692, 2785, 2786, 2787, 2877, 2878, 2982, 3086, 3087, 3180, 3378, 3379, 3485, 3486;* Ellis, N. Am. Fungi *243a, b;* Ellis & Ev. Fungi Columb. *651;* Thaxter, Rel. Farl. *287;* Seym. & Earle, Econ. Fungi *10.*

258. **Nigredo Clitoriae.**

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 58.*

258. **Nigredo Neurocarpi.**

Add the hosts:

Bradburya pubescens (Benth.) Kuntze, Salvador.
Clitoria guianensis (Aubl.) Benth., Cuba.
Clitoria rubiginosa Juss. (*C. glycinoides* DC., *Martiusia rubiginosa* Britton), Cuba, Jamaica, Porto Rico.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 59.*

258. **Nigredo Dolicholi.**

Add the synonyms: *Uredo Pamparum* Speg. Anal. Soc. Ci. Argent. **12**: 74. 1881. *Puccinia Dolichi* Arth. Bull. Torrey Club **33**: 28. 1906. *Uredo Dolichi* Arth. Bull. Torrey Club **33**: 513. 1906.

Add the hosts:

Cajan Cajan (L.) Millsp. (*Cajanus indicus* Spreng.), Florida; Cuba; Porto Rico; Santo Domingo; St. Croix; St. Thomas.
Dolicholus minimus (L.) Medic. (*Rhynchosia minima* DC.), Porto Rico.
Dolicholus reticulatus (Sw.) Millsp. (*Rhynchosia reticulata* DC.), Cuba; Porto Rico; St. Croix; St. Thomas.

Change the distribution to read: Southern Texas to southern Florida and the West Indies; also in South America.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 67.* EXSICCATI: Barth. Fungi Columb. *4091;* Barth. N. Am. Ured. *1689, 2986.*

259. Insert:

67a. **Nigredo Geranii** (DC.) Arthur.

Uredo Geranii DC. Syn. Pl. 47. 1806.
Aecidium Geranii DC. Fl. Fr. **6**: 93. 1815.
Caeoma geraniatum Link, in Willd. Sp. Pl. **6**[2]: 57. 1825.
Uromyces Geranii Fries, Summa Veg. Scand. 514. 1849.
Uromyces puccinioides Rabh. Bot. Zeit. **1851**: 627. 1851.
Trichobasis Geranii Berk. Outl. Brit. Fung. 333. 1860.
Aecidium violaceum Trel. Harriman Alaska Exp. Crypt. 37. 1904.

O. Pycnia amphigenous, in small groups surrounded by the aecia, honey-yellow, in section flattened-globoid, 120–150 μ broad by 90–110 μ high; ostiolar filaments short.

I. Aecia hypophyllous or petiolicolous, on somewhat thickened, purplish, and usually depressed spots 5–15 mm. across, often extending along the veins, bullate, small, 0.3–0.4 mm. in diameter, ruptured epidermis somewhat overarching; peridium yellowish, evanescent; peridial cells loosely joined, narrowly rhomboidal, 12–15 by 24–32 μ, slightly overlapping, the outer wall 3–4 μ thick, smooth, the inner wall slightly thinner, 2.5–3.5 μ, finely verrucose; aeciospores broadly ellipsoid, 20–24 by 26–30 μ; wall nearly or quite colorless, 2–2.5 μ thick, noticeably verrucose.

II. Uredinia hypophyllous, round, 0.3–0.5 mm. in diameter, somewhat tardily naked, cinnamon-brown, pulverulent, ruptured epidermis noticeable; urediniospores globoid or ellipsoid, 22–24 by 24–30 μ; wall cinnamon-brown, 1.5–2 μ thick, moderately echinulate, with 1 pore, usually in the equator.

III. Telia hypophyllous, scattered, round, 0.3–0.5 mm. in diameter, somewhat tardily naked, pulvinate, becoming pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid or obovoid, 18–24 by 26–38 μ, rounded above, rounded or sometimes narrowed below; wall chestnut-brown, 1.5–2 μ thick, with hyaline umbo over pore, 4–6 μ thick, smooth; pedicel colorless, fragile, short.

ON GERANIACEAE:
Geranium erianthum DC., Alaska.
TYPE LOCALITY: France, on *Geranium aconitifolium.*
DISTRIBUTION: Southeastern Alaska; also in Europe.
ILLUSTRATIONS: Grev. Scot. Crypt. Fl. *pl. 8;* Beitr. Krypt. Schweiz **2**[2]: *f. 14;* Sitz.-ber. Böhm. Ges. Wiss. **1892**[2]: *f. 6–10;* Bubák, Pilze Böhmens *f. 5;* Fl. Ibér. Ured. **2**: *f. 46.*

259. **Nigredo proëminens.**

In the synonymy the year for the publication of *Uromyces proëminens* Pass. should read 1874.

Add the synonyms: *Aecidium Euphorbiae* Schw. Schr. Nat. Ges. Leipzig **1**: 69, hyponym. 1822. *Uredo Euphorbiae-nudiflorae* P. Henn. Hedwigia **37**: 278. 1898.

Omit from the hosts, after *C. hypericifolia:* " District of Columbia, Indiana, Iowa, Missouri, Nebraska, New York, North Carolina, Ohio, Pennsylvania, West Virginia," all of which belong under *C. Preslii,* and in their places insert " Costa Rica;

Panama; Bermuda; Cuba; Porto Rico"; omit, after *C. hyssopifolia*, "Florida," and add Porto Rico; also, under *Poinsettia heterophylla*, omit "Morelos."

Add the hosts:

Aklema nudiflora (Jacq.) Raf. (*Euphorbia nudiflora* Jacq.), Jamaica.
Chamaesyce Blodgettii (Engelm.) Small (*Euphorbia Blodgettii* Engelm.), Bermuda.
Chamaesyce densiflora (Klotzsch) Millsp. (*Euphorbia densiflora* Klotzsch), Salvador.
Chamaesyce Fendleri (T. & G.) Small (*Euphorbia Fendleri* T. & G.), Utah.
Chamaesyce oregonensis Millsp., Oregon.
Chamaesyce polycarpa (Benth.) Millsp. (*Euphorbia polycarpa* Engelm.), Arizona, California.
Chamaesyce strictospora (Engelm.) Small (*Euphorbia strictospora* Engelm.), New Mexico, Oklahoma.
Poinsettia cuphusperma (Engelm.) Small (*Euphorbia cuphusperma* Engelm.), New Mexico.
Poinsettia cyathophora (Murr.) A. Brown (*Euphorbia cyathophora* Murr.), Florida; Morelos; Bermuda; Cuba; Porto Rico.
Zygophyllidium bilobatum (Engelm.) Standley (*Euphorbia bilobata* Engelm.), New Mexico.
Zygophyllidium macropodoides (Rob. & Greenm.) Arth. (*Euphorbia macropodoides* Rob. & Greenm.), Morelos.

Add the illustrations: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 15;* Fl. Ibér. Ured. **2**: *f. 20, 21.*

Add the exsiccati: Barth. Fungi Columb. *3695, 3696, 3697, 3698, 4194, 4299, 4594, 4595;* Barth. N. Am. Ured. *296, 297, 298, 396, 495, 496, 497, 695, 696, 697, 798, 799, 895, 993, 1096, 1197, 1496, 1598, 1793, 1794, 1893, 1894, 1996, 1997, 2096, 2196, 2197, 2297, 2298, 2395, 2594, 2595, 2697, 2796, 2797, 2798, 2893, 2894, 2997, 3097, 3194, 3293, 3294, 3393, 3394, 3395, 3497, 3498;* Brenckle, Fungi Dak. *71a, 155, 177;* Ellis & Ev. Fungi Columb. *253;* Garrett, Fungi Utah. *247;* Sydow, Ured. *2504.*

261. Insert:

69a. **Nigredo dictyosperma** (Ellis & Ev.) Arthur.

Uromyces dictyosperma Ellis & Ev. N. Am. Fungi *2882*, hyponym. 1893.
Uromyces dictyosperma Ellis & Ev.; Tranz. Ann. Myc. **8**: 12. 1910.

O. Pycnia hypophyllous, scattered among the aecia, inconspicuous, in section depressed-globoid, small, 90–115 μ broad by 60–90 μ high; ostiolar filaments agglutinate.

I. Aecia hypophyllous, evenly scattered over large areas from a distributed mycelium, cupulate; peridium yellowish, the margin slightly recurved, erose; peridial cells rectangular or rhomboidal, 14–18 by 20–24 μ, slightly overlapping, the outer wall 5–9 μ thick, transversely striate, smooth, the inner wall 3–3.5 μ thick, verrucose; aeciospores globoid or ellipsoid, 12–16 by 16–20 μ; wall thin, 1–2 μ, very finely verrucose.

II. Uredinia chiefly hypophyllous, scattered, round, large, 0.5–1.5 mm. in diameter, somewhat tardily naked, cinnamon-brown, pulverulent, ruptured epidermis conspicuous; urediniospores globoid, 16–20 μ in diameter; wall nearly colorless, 1.5–2 μ thick, finely and inconspicuously verrucose, the pores about 6, scattered.

III. Telia chiefly hypophyllous, scattered, round, 0.5–1.5 mm. in diameter, tardily naked, blackish-brown, somewhat pulverulent, ruptured epidermis conspicuous; teliospores globoid or ellipsoid, 18–24 by 24–30 μ, rounded above and below; wall chestnut-brown, uniformly 2–2.5 μ thick exclusive of tubercles, coarsely tuberculate, the tubercles 3–3.5 μ high; pedicel colorless, short, deciduous.

ON EUPHORBIACEAE:
Tithymalus arkansanus (Engelm. & Gray) Klotzsch & Garcke (*Euphorbia arkansana* Engelm. & Gray), Colorado, Kansas, Nebraska, Oklahoma, South Dakota, Texas.
Tithymalus dictyospermus (Fisch. & Mey.) A. Heller (*Euphorbia dictyosperma* Fisch. & Mey.), California, Washington.
Tithymalus missouriensis (Norton) Small (*Euphorbia missouriensis* Norton), Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Wyoming.
Tithymalus obtusatus (Pursh) Small (*Euphorbia obtusata* Pursh), California.

TYPE LOCALITY: Hilgers, Montana, on *Euphorbia dictyosperma*, now determined as *E. missouriensis*.

DISTRIBUTION: Eastern North Dakota to western Texas and westward to California.

ILLUSTRATION: E. & P. Nat. Pfl. 1**: *f. 35D.*

EXSICCATI: Barth. Fungi Columb. *3495;* Barth. N. Am. Ured. *884, 1190, 2486, 2487, 2881, 2985;* Ellis & Ev. Fungi Columb. *1597;* Ellis & Ev. N. Am. Fungi *2882;* Sydow, Ured. *1554.*

69b. **Nigredo Janiphae** (Wint.) Arthur.

Uredo Janiphae Wint. Grevillea **15**: 86. 1887.
Uromyces Jatrophae Dietel & Holway, Bot. Gaz. **24**: 25. 1897.
Uromyces dichrous Vesterg. Micr. Rar. Sel. *1516*, hyponym. 1913.
Uromyces Janiphae Arth. Mycologia **7**: 190. 1915.

O. Pycnia amphigenous, on brownish-yellow spots, inconspicuous, honey-yellow, in section globoid, 80–150 by 112–160 μ; ostiolar filaments agglutinate.

I. Aecia hypophyllous, few, crowded or confluent on brownish-yellow spots, round, 0.3–0.5 mm. in diameter, tardily erumpent, ruptured epidermis overarching; peridium none; aeciospores globoid or ellipsoid, 16–23 by 19–26 μ; wall colorless, thick, 2.5–3.5 μ, moderately and coarsely verrucose.

II. Uredinia amphigenous, caulicolous, and fructicolous, scattered, roundish, oblong, or linear, 0.3–2 mm. long, early naked, yellowish-brown, pulverulent, ruptured epidermis evident; urediniospores ellipsoid or obovoid, 18–24 by 19–32 μ; wall brownish-yellow or nearly colorless, 1.5–3 μ thick, moderately echinulate, the pores obscure, probably 4–6, scattered.

III. Telia amphigenous, scattered, roundish, 0.2–1.5 mm. across, early naked, chocolate-brown, somewhat pulverulent, ruptured epidermis conspicuous; teliospores ellipsoid or globoid, 17–29 by 26–42 μ; wall 2.5–5 μ thick, thickened into an acute apex, 7–12 μ, laminate, the inner layer chestnut-brown, the outer layer golden-brown, somewhat hygroscopic and frequently inconspicuous, closely and coarsely verrucose, sometimes forming longitudinal lines; pedicel colorless, except a slightly tinted collar next to spore, once to once and a half length of spore.

ON EUPHORBIACEAE:
Jatropha multifida L., Jalisco.
Manihot Manihot (L.) Cockerell (*M. utillissima* Pohl, *Jatropha Manihot* L., *Janipha Manihot* H.B.K.), Jalisco; Costa Rica; Cuba, Jamaica, Porto Rico.
TYPE LOCALITY: [São Francisco, Brazil], on *Janipha Manihot*.
DISTRIBUTION: Central Mexico and the West Indies; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 6, f. 92*.
EXSICCATI: Barth. Fungi Columb. *4093, 4695;* Barth. N. Am. Ured. *193, 391;* Ellis & Ev. Fungi Columb. *2096;* Sydow, Ured. *1509;* Vesterg. Mic. Rar. Sel. *871, 1516*.

69c. **Nigredo** (?) **globosa** (Dietel & Holway) Arthur.

Uromyces globosus Dietel & Holway; Holway, Bot. Gaz. **24**: 23. 1897.

O and I. Pycnia and aecia unknown.

II. Uredinia hypophyllous, few, gregarious, roundish, 0.5–0.8 mm. across, early naked, cinnamon-brown, ruptured epidermis very prominent; urediniospores obovate, 19–27 by 35–52 μ; wall cinnamon-brown, paler below, 1–1.5 μ thick, much thicker above, 4–9 μ, sparsely and strongly echinulate, the pores indistinct, 2, approximately equatorial.

III. Telia chiefly hypophyllous, numerous, scattered, irregularly roundish, 0.1–1 mm. across, soon naked, dark chocolate-brown, somewhat pulverulent, ruptured epidermis noticeable; teliospores globoid or obovate-globoid, 27–34 by 34–42 μ; wall thick, 6–9 μ, thickened by a broad umbo above, 10–15 μ, laminate, the inner layer dark chocolate-brown, 4–5 μ thick, the outer layer cinnamon-brown, swelling in water, closely and moderately verrucose; pedicel colorless, 6–10 μ thick, strongly bulbous next to spore, once to twice length of spore.

ON EUPHORBIACEAE:
Sapium macrocarpum Muell.-Arg. (*S. mexicanum* Hemsl.), Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on "some euphorbiaceous tree" [*Sapium macrocarpum*].
DISTRIBUTION: Vicinity of Cuernavaca, Mexico.
ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 6, f. 97*.
EXSICCATI: Barth. Fungi Columb. *3890;* Barth. N. Am. Ured. *189, 488;* Sydow, Ured. *1506*.

261. **Nigredo Gouaniae.**

Insert at the end of the description of the teliospore-wall the word " verrucose."

261. **Nigredo Hyperici-frondosi.**

Omit from the hosts: "*Hypericum aureum*," an erroneous determination for *H. prolificum* L., also omit "Wisconsin" after *H. canadense*, "Iowa" after *H. mutilum*, and "Iowa" after *Triadenum virginicum*, and add the following hosts:

Hypericum anagalloides Cham. & Schlecht., California.
Hypericum pratense Cham. & Schlecht., Guatemala.
Hypericum Scouleri Hook., Oregon.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 3, f. 49.*

Add the exsiccati: Barth. Fungi Columb. *3694, 3892, 4190;* Barth. N. Am. Ured. *291, 292, 389, 390, 489, 2390, 3187, 3493;* Thaxter, Rel. Farl. *293a, b;* Sydow, Ured. *2403, 2404.*

262. **Nigredo plumbaria.**

Add the hosts:

Gaura angustifolia Michx., Mississippi.
Gaura induta Wooton & Standley, New Mexico, Oklahoma.
Gaura neomexicana Wooton, Colorado.
Lavauxia tanacetifolia T. & G., Nevada.
Oenothera muricata L., New York.
Taraxia ovata (Nutt.) Small (*Oenothera ovata* Nutt.), California.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 3, f. 46–48.*

Omit from the exsiccati: Ellis & Ev. Fungi Columb. *1994.*

Add the exsiccati: Barth. Fungi Columb. *1994, 3893;* Barth. N. Am. Ured. *493, 596, 1396, 1495, 1790, 1791, 2294, 2393, 2995, 3192, 3193, 3291, 3292;* Ellis & Ev. Fungi Columb. *872;* Ellis & Ev. N. Am. Fungi *2895, 3584.*

263. **Nigredo Limonii.**

Add the synonym: *Capitularia Limonii* Sydow, Ann. Myc. **20**: 123. 1922.

Add the host: *Limonium limbatum* Small, New Mexico, Texas.

Insert: ILLUSTRATIONS: Grove, Brit. Rust Fungi *f. 40;* Fl. Ital Crypt. Ured. *f. 38b;* Sitz.-ber. Böhm. Ges. Wiss. **1902**[46]: *f. 13–18;* Fl. Ibér. Ured. **2**: *f. 61.*

Add the exsiccati: Thaxter, Rel. Farl. *297.*

264. Insert:

73a. **Nigredo Armeriae** (Schlecht.) Arthur.

Caeoma Armeriae Schlecht. Fl. Berol. **2**: 126. 1824.
Uredo Armeriae Link, in Willd. Sp. Pl. **6**[2]: 11. 1825.
Erysibe Armeriae Wallr. Fl. Crypt. Germ. **2**: 208. 1833.
Uromyces Armeriae Lév. Ann. Sci. Nat. III. **8**: 375. 1847.

O. Pycnia amphigenous, in small groups, punctiform, inconspicuous.

I. Aecia amphigenous, in small groups 1–4 cm. across, small, cupulate; peridium whitish, the margin erose; peridial cells rhomboidal, 16–20 by 28–38 μ, considerably overlapping, the outer wall 7–10 μ thick, transversely striate, smooth, the inner wall much thinner, 2.5–3.5 μ, conspicuously verrucose; aeciospores angularly globoid or broadly ellipsoid, 16–20 by 18–26 μ; wall colorless, thin, 1–1.5 μ, closely and minutely verrucose.

II. Uredinia amphigenous or caulicolous, scattered, round, 0.5–1 mm. across, tardily naked, pulverulent, ruptured epidermis conspicuous; urediniospores globoid or obovoid, 22–28 by 22–32 μ; wall cinnamon-brown, thick, 2.5–3 μ, very finely and closely verrucose, the pores 2–4, equatorial.

III. Telia amphigenous or caulicolous, scattered, round, 0.5–1 mm. in diameter, somewhat tardily naked, chestnut-brown, becoming pulverulent, ruptured epidermis conspicuous; teliospores globoid or ellipsoid, 22–30 by 28–38 μ, rounded above and below; wall chestnut-brown, 2–2.5 μ thick, thicker above, 7–9 μ, smooth; pedicel colorless, short, deciduous.

ON ARMERIACEAE:
Statice Armeria L. (*Armeria vulgaris* Willd.), California, Oregon.
TYPE LOCALITY: Berlin, Germany, on *Armeria vulgaris.*

DISTRIBUTION: Pacific coast from northern Oregon to central California; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 39;* Grove, Brit. Rust Fungi *f. 41;* Fl. Ital. Crypt. Ured. *f. 38a;* Sitz.-ber. Böhm. Ges. Wiss. 1902^{46}: *f. 11, 12.*

264. **Nigredo (?) speciosa.**

Change the first host to read *Frasera speciosa* Dougl.

Add to type locality: " error for *F. speciosa.*"

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 2, f. 35.*

264. **Nigredo Gentianae.**

Add the hosts:

Amarella heterosepala (Engelm.) Greene (*Gentiana heterosepala* Engelm.), New Mexico.
Pleurogyne rotata (L.) Griseb., Quebec.

Add the exsiccati: Barth. Fungi Columb. *4890;* Barth. N. Am. Ured. *1490, 1983.*

264. **Nigredo (?) Howei.**

Reduce this name to synonymy, and substitute: **Nigredo (?) Asclepiadis** (Schw.) Arthur.

Add the synonyms: *Uredo Asclepiadis* Schw.; Berk. & Curt. Jour. Acad. Phila. II. **2**: 282. 1853. *Uredo asclepiadina* Speg. Anal. Mus. Nac. Buenos Aires III. **12**: 316. 1909.

Add the hosts:

Asclepias guatemalensis Donn.-Sm., Guatemala.
Asclepias nivea L., Cuba.
Asclepias purpurascens L., Missouri.
Vincetoxicum Shortii (A. Gray) Britton (*Gonolobus Shortii* A. Gray), Indiana.

Add the exsiccati: Barth. N. Am. Ured. *595, 688, 1593, 1694, 2289, 2388, 2588, 2693, 2888, 3186, 3492;* Thaxter, Rel. Farl. *289.*

265. **Nigredo Solani.**

Add the host: *Solanum nudum* H.B.K. Guatemala.

Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 2, f. 27.*

265. **Nigredo (?) Ruelliae.**

Insert at end of first line of the description of the telia: " or forming fusiform swellings on stems, 2–3 cm. long,";

Add: EXSICCATI: Barth. N. Am. Ured. *1600.*

266. **Nigredo Bouvardiae.**

Add the host: *Bouvardia laevis* Mart. & Gal., Hidalgo.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 1, f. 20.*

Add the exsiccati: Barth. Fungi Columb. *3889.*

266. **Nigredo Spermacoces.**

Add the exsiccati: Barth. N. Am. Ured. *2099, 2200, 2398, 2800, 2895, 2999, 3100;* Rav. Fungi Car. **2**: *91.*

267. **Nigredo Helleriana.**

Add the hosts:

Cayaponia americana (Lam.) Cogn., Porto Rico.
Cayaponia attenuata Cogn., Costa Rica; Panama.
Fevillea cordifolia L., Porto Rico.
Melothria guadalupensis (Spreng.) Cogn., Cuba; Porto Rico.
Melothria scabra Naud., Guatemala.

Add: EXSICCATI: Barth. N. Am. Ured. *1691.*

267. Insert:

81a. **Nigredo compacta** (Peck) Arthur.

Uromyces compactus Peck, Bot. Gaz. **7**: 56. 1882.
Uromycopsis compacta Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Uromyces Boltoniae H. S. Jackson; Barth. N. Am. Ured. *3488.* 1926.

O. Pycnia caulicolous, crowded in center of the aecial area, inconspicuous, punctiform, in section globoid or flask-shaped, 110–160 μ wide by 130–220 μ high; ostiolar filaments short.

I. Aecia caulicolous, crowded in fusiform or elongate groups 5–15 mm. long, cylindric, 0.2–0.5 mm. in diameter, 0.7–1.5 mm. high; peridium colorless, the margin erect, erose, and finally lacerate; peridial cells rhombic or rhomboidal, slightly overlapping, 16–23 by 45–51 μ, the wall 5 μ thick, the outer wall transversely striate, smooth, the inner wall coarsely verrucose; aeciospores ellipsoid or oblong, 20–26 by 26–32 μ; wall colorless, 1–2 μ thick, finely and inconspicuously verrucose.

II. Uredinia caulicolous, few, scattered, round or oblong, about 0.5 mm. across, early naked, cinnamon-brown, ruptured epidermis evident; urediniospores ellipsoid or oblong, 23–30 by 32–45 μ; wall light cinnamon-brown, 1–1.5 μ thick, moderately and finely echinulate, the pores 2, equatorial.

III. Telia caulicolous, thickly scattered, round or oblong, 0.5 mm. across, early naked, pulvinate, dark chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid, oblong, or obovate, 19–30 by 30–42 μ, rounded above, usually narrowed below; wall chestnut-brown, 1.5–2 μ thick, thicker above, 5–8 μ, smooth; pedicel colorless, persistent, once to once and a half length of spore.

ON CARDUACEAE:
Leucosyris spinosa (Benth.) Greene (*Aster spinosus* Benth.), Arizona, New Mexico.
TYPE LOCALITY: Arizona, on "dead stems of some composite plant" [*Leucosyris spinosa*].
DISTRIBUTION: Southern Arizona and New Mexico.
ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 1, f. 2.*
EXSICCATI: Barth. N. Am. Ured. *3381, 3488;* Ellis & Ev. Fungi Columb. *1284;* Ellis & Ev. N. Am. Fungi *3566;* D. Griff. West Am. Fungi *382.*

81b. **Nigredo Polymniae** (P. Henn.) Arthur.

Uredo Polymniae P. Henn. Hedwigia Beibl. **38**: 129. 1899.
Uromyces Polymniae Dietel & Holway; Holway, Bot. Gaz. **31**: 327. 1901.

O. Pycnia epiphyllous, gregarious on pale spots, punctiform, inconspicuous, golden-brown, in section globoid, 150–175 μ in diameter; ostiolar filaments short.

I. Aecia hypophyllous, in circinate groups opposite the pycnia, bullate, round or oblong, 0.3–1 mm. in longest diameter; peridium delicate, incurved, the margin erose; peridial cells oblong or elongate, 18–23 by 30–60 μ, abutted or somewhat overlapping, the outer wall 2–3 μ thick, finely verrucose, the inner wall 5–7 μ thick, coarsely verrucose; aeciospores globoid or ellipsoid, 16–23 by 19–30 μ; wall colorless, 1.5–3 μ thick, closely verrucose.

II. Uredinia chiefly hypophyllous, numerous, scattered, round, 0.2–0.5 mm. in diameter, early naked, cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores globoid or obovoid-globoid, 21–26 μ in diameter; wall cinnamon-brown, 1–1.5 μ thick, moderately and finely echinulate, the pores 2, distinctly subequatorial.

III. Telia chiefly hypophyllous, numerous, scattered, roundish, 0.2–0.8 mm. across tardily naked, pulvinate, chestnut-brown, ruptured epidermis conspicuous; teliospores globoid or ellipsoid, 23–28 by 26–36 μ, rounded or truncate above, rounded or somewhat narrowed below; wall chestnut- or cinnamon-brown, 1.5–2.5 μ thick, much thicker above, 7–12 μ, smooth; pedicel slightly tinted, persistent, one and a half to twice length of spore.

ON CARDUACEAE:
Polymnia maculata Cav., Mexico (state), Michoacan; Guatemala.
TYPE LOCALITY: Novo Friburgo near Rio de Janeiro, Brazil, on *Polymnia* sp.
DISTRIBUTION: Southern Mexico and Guatemala; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 1, f. 8.*
EXSICCATI: Barth. Fungi Columb. *3894;* Barth. N. Am. Ured. *97, 395.*

81c. **Nigredo senecionicola** Arthur.

Uromyces senecionicola Arth. Bot. Gaz. **40**: 198. 1905.

O. Pycnia epiphyllous, crowded in small groups opposite the aecia, punctiform, brownish.

I. Aecia few, hypophyllous, crowded in small groups or solitary; peridium colorless, fragile; aeciospores irregularly globoid or ellipsoid; wall colorless, 1–2 μ thick, closely verrucose.

II. Uredinia few, hypophyllous, scattered or in groups, round, 0.3–0.8 mm. in diameter, somewhat tardily naked, cinnamon-brown, ruptured epidermis noticeable; urediniospores ellipsoid, 18–23 by 26–28 μ; wall pale cinnamon-brown, 1–2 μ thick, sparsely and strongly echinulate, the pores obscure, probably 2, equatorial.

III. Telia hypophyllous, thickly scattered, irregularly roundish, 0.5 mm. in diameter or less, long covered by the grayish epidermis; teliospores ellipsoid or obovoid, 18–23 by 28–36 μ; wall cinnamon-brown, 1–2 μ thick, thicker above, 3–8 μ, smooth; pedicel nearly or quite colorless, persistent, as long as spore or shorter.

This species is morphologically similar to *Dicaeoma senecionicola* (Arth.) Arth. & Jackson, except in having unseptated teliospores, is found on similar hosts, and occurs in the same region. The two species, now kept separate for convenience, should eventually be united under one name.

ON CARDUACEAE:
Senecio Roldana DC., Mexico (state).
Senecio sp., Michoacan.
TYPE LOCALITY: Amecameca, Mexico, on *Senecio Roldana*.
DISTRIBUTION: Southern Mexico.
ILLUSTRATION: Sydow, Monog. Ured. 2: *pl. 1, f. 11.*
EXSICCATI: Barth. N. Am. Ured. *1296, 1497.*

81d. **Nigredo Salmeae** (Arth. & Holway) Arthur.

Uromyces Salmeae Arth. & Holway, Am. Jour. Bot. 5: 445. 1918.

O. Pycnia amphigenous, few, in groups on discolored spots, noticeable, brownish, in section globoid or ellipsoid, 160–200 μ broad by 190–230 μ high; ostiolar filaments up to 96 μ long.

I. Aecia amphigenous, grouped with the pycnia on discolored spots 1–2 mm. across, cupulate, 0.1–0.2 mm. in diameter; peridium delicate, not extending above the leaf-surface; peridial cells soon collapsing, the walls thin, 1 μ, closely and coarsely verrucose; aeciospores ellipsoid or oblong, 19–26 by 29–50 μ; wall colorless or pale cinnamon-brown, 1.5–2 μ thick, often thicker above, up to 5 μ, closely and coarsely verrucose.

II. Uredinia chiefly hypophyllous, scattered, oval or oblong, 0.3–0.8 mm. long, early naked, cinnamon-brown, somewhat pulverulent, ruptured epidermis evident; urediniospores ellipsoid or obovoid, 23–27 by 30–35 μ; wall cinnamon-brown, 1–1.5 μ thick, finely and moderately echinulate, the pores indistinct, 2, slightly superequatorial.

III. Telia hypophyllous, scattered, oval or oblong, 0.3–0.8 mm. long, early naked, light chestnut-brown, somewhat pulverulent, ruptured epidermis noticeable; teliospores oblong or narrowly ellipsoid, 18–23 by 35–50 μ, narrowed above and below; wall golden-brown above, lighter to colorless below, thin, 1 μ, abruptly and greatly thickened above, 5–13 μ, smooth; pedicel colorless, fragile, as long as spore.

ON CARDUACEAE:
Salmea scandens (L.) DC., Guatemala; Porto Rico.
TYPE LOCALITY: San Lucas Toliman, Solola, Guatemala, on *Salmea scandens*.
DISTRIBUTION: Porto Rico and southern Guatemala.

267. **Nigredo Martinii.**

Change the first host to read: *Melanthera hastata* Michx.

267. Insert:

82a. **Nigredo columbiana** (Mayor) Arthur.

Uromyces columbianus Mayor, Mém. Soc. Neuch. Sci. Nat. 5: 467. 1913.

O. Pycnia chiefly epiphyllous, dark-brown, inconspicuous, in section globoid or flask-shaped, 90–140 μ broad by 95–150 μ high; ostiolar filaments short.

I. Aecia hypophyllous, few, in small groups 2–8 mm. across, often extending along veins, bullate, surrounded by the overarching epidermis; peridium rudimentary; peridial cells loosely united and soon falling apart, scarcely distinguishable from aeciospores; aeciospores ellipsoid, 14–18 by 20–24 μ; wall colorless, 1.5 μ thick, finely but noticeably verrucose.

II. Uredinia amphigenous, scattered, round, small, 0.2–0.4 mm. in diameter, early naked, cinnamon-brown, pulverulent, ruptured epidermis noticeable; urediniospores globoid or obovoid, 16–18 by 18–22 μ; wall cinnamon-brown, 1–1.5 μ thick, finely and rather closely echinulate, the pores 2, approximately equatorial.

III. Telia amphigenous, scattered, round, small, 0.2–0.4 mm. in diameter, early naked, light chestnut-brown, soon pulverulent, ruptured epidermis noticeable; teliospores germinating at maturity, oblong or narrowly ellipsoid, 12–20 by 22–34 μ, rounded above, usually somewhat narrowed below; wall light chestnut-brown above, nearly colorless below, thin, 1–1.5 μ, abruptly thickened above, 5–6 μ, smooth; pedicel colorless, fragile, short.

ON CARDUACEAE:
Melanthera angustifolia A. Rich., Florida.
Melanthera aspera (Jacq.) Steud., Costa Rica; Guatemala.
Melanthera canescens (Kuntze) O. E. Schulz, Porto Rico.
Melanthera deltoidea Michx. (*M. brevifolia* O. E. Schulz), Costa Rica; Salvador; Bahamas; Cuba.
Melanthera hastata Michx. (*M. oxylepis* DC.), Costa Rica; Guatemala; Cuba; Porto Rico.
Melanthera nivea (L.) Small, Porto Rico.
TYPE LOCALITY: Medellin, Antioquia, Colombia, on *Melanthera aspera*.
DISTRIBUTION: Central America and the West Indies; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 468. *f. 13*.

268. **Nigredo cucullata.**

Change size of urediniospores to "16–23 by 19–24 μ."

Omit the sixth host.

Add the hosts:

Baltimora recta L., Guatemala; Panama; Salvador; Cuba.
Perymenium macrocephalum Greenm., Guerrero.
Perymenium Purpusii Brand., Guatemala.
Perymenium strigillosum (Rob. & Greenm.) Greenm., Guatemala.
Zexmenia scandens Hemsl., Guatemala.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 1, f. 18*.

268. **DICAEOMA.**

Add the synonyms: *Eriosporangium* Bertero; Lév. Ann. Sci. Nat. III. **5**: 269. 1846. *Argotelium* Arth. Résult. Sci. Congr. Bot. Vienne 343, excl. descr. 1906. *Pleomeris* Sydow, Ann. Myc. **19**: 171. 1921. *Persooniella* Sydow, Ann. Myc. **20**: 118. 1922.

269. In the key.

Replace lines 16–21 by:

Paraphyses encircling the sori; urediniospore-pores 4; teliospores 35–50 μ long.	9. *D. Kaernbachii.*
Paraphyses intermixed; urediniospore-pores 4 or 5; teliospores 29–39 μ long.	38. *D. unicum.*

For "18. *D. Huberi*" read "18. *D. leve*."

270. In the key.

For "32. *D. Arthuri*" read "32. *D. Gymnotrichis*."

For "39. *D. interveniens*" read "39. *D. Eurotiae*."

For "28. *D. eslavense*" read "28. *D. atrum*."

272. In the key.

Replace lines 50 and 51 by:

Teliospores medium-sized (13–19 × 30–61 μ), with prominent projections.	
Projections 3–12 μ long, spreading.	57. *D. Rhamni.*
Projections 10–25 μ long, erect.	58. *D. Periclymeni.*

274. In the key.

Replace line 2 by:

Urediniospore-wall 2–2.5 μ thick.	
Teliospores 45–64 μ long, the apex 16–23 μ thick.	130. *D. spatiosum.*
Teliospores 42–56 μ long, the apex 10–15 μ thick.	130a. *D. Allenii.*

Replace line 14 by:

Urediniospore-wall moderately thick (2–2.5 μ).	
Urediniospores small (19–23 × 23–29 μ).	121*a*. *D. paludosa*.
Urediniospores large (23–29 × 29–39 μ).	114. *D. Cladii*.

276. In the key.

Replace line 77 by:

Pedicels slender.	
Apical thickening of teliospore broad.	239. *D. evadens*.
Apical thickening of teliospore abruptly narrow.	244*a*. *D. Plucheae*.

277. **Dicaeoma Sorghi.**

Add the illustration: Fl. Ital. Crypt. Ured. *f. 74c;* Fl. Ibér. Ured. **1**: *f. 43.*

Add the exsiccati: Barth. N. Am. Ured. *2368, 2563, 2680, 2869, 3169, 3268, 3366, 3367.*

278. **Dicaeoma pallescens.**

Add the illustration: Bull. Torrey Club **32**: 37. *f. 2II.*

279. **Dicaeoma polysorum.**

Add the hosts:

Erianthus divaricatus (L.) Hitchc., Florida.
Tripsacum laxum Nash, Virginia; Cuba.

Add the exsiccati: Barth. N. Am. Ured. *2670.*

279. **Dicaeoma Ceanothi.**

Add the illustrations: Sydow, Monog. Ured. **1**: *pl. 43, f. 556;* Bull. Torrey Club **32**: 37. *f. 2X.*

280. **Dicaeoma virgatum.**

Omit the host: *Andropogon condensatus.*

Add the exsiccati: Barth. N. Am. Ured. *2572.*

280. **Dicaeoma Mariae-Wilsoni.**

Add the synonyms: *Puccinia sagittata* Long, Phytopathology **2**: 167. 1912. *Puccinia Mariae-Wilsoni* Barth. N. Am. Ured. *204.* 1922. Not *P. Mariae-Wilsoni* G. W. Clinton, 1873.

Add the host, under Violaceae: *Viola palmata* L., Iowa.

Add the exsiccati: Barth. N. Am. Ured. *2432, 2841, 3241.*

281. **Dicaeoma Andropogonis.**

Of the hosts under Scrophulariaceae, the last name but one should read: *Penstemon virens* Pennell (*P. humilis* A. Gray, not Nutt.).

Add the host, under Scrophulariaceae: *Penstemon nitidus* Dougl., Montana.

Under exsiccati, for " D. Griff. N. Am. Fungi," read " D. Griff. W. Am. Fungi."

Add the exsiccati: Barth. N Am. Ured. *2334, 2335, 2336, 2422, 2531, 2645, 2646, 2647, 2648, 2735, 2736, 2737, 2738, 2927, 3029, 3125, 3126, 3223, 3448;* Thaxter, Rel. Farl *238.*

283. **Dicaeoma venustulum.**

Omit this species, which is merged with the next.

284. **Dicaeoma Kaernbachii.**

Add the synonyms: *Puccinia Nakanishikii* Dietel, Bot. Jahrb. **34**: 585. 1904. *Puccinia andropogonicola* Speg. Anal. Mus. Nac. Buenos Aires **19**: 299. 1909. *Uredo andropogonicola* Speg. Anal. Mus. Nac. Buenos Aires **19**: 315. 1909. *Puccinia posadensis* Sacc. & Trott. in Sacc. Syll. Fung. **21**: 691. 1912. *Uredo venustula* Arth. Mycologia **8**: 21. 1916. *Puccinia venustula* Arth. Mycologia **10**: 128. 1918. *Dicaeoma venustulum* Arth. & Fromme, N. Am. Flora **7**: 283. 1920.

Add the host: *Andropogon brevifolius* Sw. (*Schizachyrium brevifolium* Nees), Costa Rica: Porto Rico.

Change the distribution to read: Central Florida, southward into the West Indies, and from central Mexico through Central America; also in New Britain Islands (Bismarck Archipelago), and in Asia, Africa, and South America.

284. **Dicaeoma versicolor.**

Change the distribution to read: Southern Mexico; also in Hawaii.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 39, f. 516.*

284. **Dicaeoma purpureum.**

Add the synonym: *Puccinia Sorghi-halepensis* Speg. Anal. Mus. Nac. Buenos Aires **31**: 386. 1922.

Add the exsiccati: Barth. N. Am. Ured. *2671;* Sydow, Ured. *2580.*

286. **Dicaeoma leve.**

Add the synonyms: *Diorchidium goyazense* Sacc. & Sydow, in Sacc. Syll. Fung. **14**: 359. 1899. *Puccinia Huberi* P. Henn. Hedwigia Beibl. **39**: 76. 1900. *Puccinia Puttemansii* P. Henn. Hedwigia **41**: 105. 1902. *Dicaeoma Huberi* Arth. & Fromme, N. Am. Flora **7**: 287. 1920.

Add the hosts:

Panicum adspersum Trin., St. Croix.
Panicum fasciculatum Sw., Panama; Cuba; Porto Rico.
Panicum maximum Jacq., Porto Rico.
Panicum trichoides Sw., Porto Rico.
Panicum utowanaeum Scribn., Mona Island.

Add the illustrations: Hedwigia **28**: 104. *f. 1–3;* Sydow, Monog. Ured. **1**: *pl. 41, f. 539.*

287. **Dicaeoma Huberi.**

Omit this species, the data being distributed under *Dicaeoma leve*, page 286, and *D. substriatum*, page 289.

288. **Dicaeoma tubulosum.**

Add the synonyms: *Puccinia Pilgeriana* P. Henn. Bot. Jahrb. **40**: 226. 1908. *Uredo duplicata* Rangel, Arch. Mus. Nac. Rio de Janeiro **18**: 160. 1916.

Add the hosts, under Solanaceae:

Solanum diversifolium Schlecht., Guatemala.
Solanum elaeagnifolium Cav., Texas.

Insert: ILLUSTRATION: Arch. Mus. Nac. Rio de Janeiro **18**: *pl. 5, f. 14, 15; pl. 6, f. 1, 2.*

289. **Dicaeoma substriatum.**

Add the synonyms: *Uredo Panici* P. Henn. Hedwigia **43**: 165. 1904. Not *U. Panici* Arth. 1902. *Uredo Henningsii* Sacc. Syll. Fung. **17**: 456. 1905. *Uredo Eriochloae* Speg. Anal. Mus. Nac. Buenos Aires **19**: 319. 1909. Not *U. Eriochloae* Sydow, 1906. *Uredo eriochloana* Sacc. & Trott. in Sacc. Syll. Fung. **21**: 810. 1912. *Puccinia dolosa* Arth. & Fromme, Torreya **15**: 262. 1915. *Puccinia Maublancii* Rangel, Arch. Mus. Nac. Rio de Janeiro **18**: 159. 1916. *Uredo cubangoensis* Rangel, Arch. Mus. Nac. Rio de Janeiro **18**: 160. 1916.

Add the hosts:

Chaetochloa sulcata (Aubl.) Hitchc., Panama.
Paspalum paniculatum L., Morelos.
Paspalum tenellum Willd., Jalisco, Mexico (state).
Paspalum virgatum L., Cuba; Porto Rico.

Add the illustrations: Sydow, Monog. Ured. **1**: *pl. 42, f. 542;* Arch. Mus. Nac. Rio de Janeiro **18**: *pl. 5, f. 1, 2.*

Add the exsiccati: Arth. & Holway, Ured. Exs. Ic. *42b;* Barth. N. Am. Ured. *2776;* Sydow, Ured. *1986.*

290. **Dicaeoma emaculatum.**

Add the exsiccati: Barth. N. Am. Ured. *2842;* Thaxter, Rel. Farl. *253.*

291. **Dicaeoma Pammelii.**

Add the host, under Poaceae: *Panicum amarum* Ell., Virginia.

Add the exsiccati: Barth. N. Am. Ured. *2556, 2767, 2957.*

291. **Dicaeoma atrum.**

Incorporate all data given on next page under *Dicaeoma eslavense.*

Change the distribution to read: Central Texas and Arizona southward through Central America and the West Indies; also in South America and Hawaii.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 41, f. 541.*

292. **Dicaeoma eslavense.**

This name becomes a synonym of *D. atrum* (page 291), and the data are to be merged with that species.

292. **Dicaeoma flaccidum.**

Add the synonym: *Puccinia abnormis* P. Henn. Hedwigia **35**: 243. 1896.

293. **Dicaeoma Cameliae.**

The first host under Poaceae should read: *Chaetochloa machrostachya* (H.B.K.) Scribn. & Merr. (*Setaria machrostachya* H.B.K.), Texas; the species has generally been referred erroneously to *C. composita.*

Add: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 579, *f. 84.*

293. **Dicaeoma Arthuri.**

Reduce this name to synonymy, and replace it by **Dicaeoma Gymnotrichis** (P. Henn.) Arthur and Fromme.

Add the synonyms: *Puccinia Gymnotrichis* P. Henn. Hedwigia **35**: 242. 1896. *Puccinia Burmeisteri* Speg. Anal. Mus. Nac. Buenos Aires **6**: 222. 1898.

294. **Dicaeoma Cenchri.**

Add the synonym: *Uredo cencrophila* Speg. Anal. Mus. Nac. Buenos Aires **19**: 316. 1909.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 40, f. 525.*

294. **Dicaeoma deformatum.**

Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 41, f. 535.*

295. **Dicaeoma poculiforme.**

Add the synonym: *Puccinia megalopotamica* Speg. Anal. Mus. Nac. Buenos Aires **6**: 224. 1898.

Add the host, under Berberidaceae: *Mahonia pinnata* (Lag.) Fedde (*Berberis pinnata* Lag.), California.

Add the hosts, under Poaceae:

Bromus purgans L., Indiana.
Calamagrostis hyperborea Lange, California.
Festuca californica Vasey, California.
Festuca Eastwoodae Piper, California.
Festuca Elmeri Scribn. & Merr., California.
Festuca octoflora Walt., California.
Poa arida Vasey (*P. pratericola* Rydb.), Texas.
Poa compressa L., Michigan, Pennsylvania.
Poa Howellii Vasey & Scribn., California.
Poa Sandbergii Vasey, California.
Stipa coronata Thurb., California.
Trisetum canescens Buckl., California.

Add the illustrations: Bot. Gaz. **28**: 422. *f. 6;* Bull. U. S. Dep. Agr. 1046: *pl. 3–5;* Fl. Ital. Crypt. Ured. *f. 74a;* Sydow, Monog. Ured. **1**: *pl. 41, f. 538.*

Omit from the exsiccati: Barth. N. Am. Ured. *1632;* and add Barth. N. Am. Ured. *2350, 2351, 2352, 2437, 2546, 2759, 2846, 2847, 2941, 3041, 3042, 3245, 3246, 3347, 3348;* Thaxter, Rel. Farl. *255.*

298. **Dicaeoma Majanthae.**

Add the synonym: *Pleomeris sessilis* Sydow, Ann. Myc. **19**: 171. 1921.

Add the illustration: Fl. Ital. Crypt. Ured. *f. 74d.*

Add the exsiccati: Barth. N. Am. Ured. *2452.*

299. **Dicaeoma interveniens.**

Omit this name and for it substitute: **Dicaeoma Eurotiae** (Ellis & Ev.) Arthur & Fromme.

Omit from the synonymy: *Roestelia interveniens*, *Aecidium roestelioides*, *Aecidium Malvastri*, *Aecidium interveniens*, *Puccinia interveniens*, all of which belong under *Allodus interveniens* (page 797).

Add the synonyms: *Aecidium Eurotiae* Ellis & Ev. Jour. Myc. **6**: 119. 1891. *Aecidium Eurotiae* Tranz. Ann. Myc. **5**: 547. 1907.

Omit the description of pycnia and aecia together with the hosts under Malvaceae, all of which belong under *Allodus interveniens*, and substitute:

O. Pycnia hypophyllous, scattered, occupying all or most of the leaf, conspicuous, pale honey-yellow becoming pale chestnut-brown, flattened-globoid, 144–160 μ wide by 95–115 μ high; ostiolar filaments up to 130 μ long, projecting beyond the ostiole and spreading out into a bushy mass up to 95 μ high and 130 μ wide.

I. Aecia hypophyllous, scattered, occupying all or most of the leaf, cylindric, 0.4–0.8 mm. in diameter, 1–1.5 mm. high; peridium colorless, the margin erect, erose at first, becoming somewhat lacerate; peridial cells rhomboidal, 18–23 by 23–32 μ, abutted or slightly overlapping, the outer wall thick, 7–12 μ, finely and transversely striate, smooth, the inner wall thinner, 3.5–5 μ, closely tuberculate; aeciospores globoid or ellipsoid, 16–19 by 19–24 μ; wall colorless, thin, 1–1.5 μ, closely and finely verrucose.

ON CHENOPODIACEAE:
Eurotia lanata (Pursh) Moq., Colorado, Montana, New Mexico, Washington, Wyoming.

Emend the description of the telia and teliospores to read: telia blackish- or chocolate-brown; teliospores ellipsoid, 23–27 by 35–42 μ; wall chestnut-brown, 2–3 μ thick, somewhat thickened above, 4–6 μ, smooth.

Omit, under Poaceae, "California" after *Oryzopsis hymenoides*, and add "Colorado, Wyoming"; and after *Stipa comata* replace "Colorado" with "Montana"; also omit the last six hosts under Poaceae, with their localities, all of which belong under *Allodus interveniens*.

Change the type locality to read: Helena, Montana, on *Eurotia lanata*.

Change the distribution to read: Wyoming to southeastern Washington and southward to Nevada and southern New Mexico; also in eastern Europe.

Omit from the exsiccati all but D. Griff. W. Am. Fungi *387;* and add Barth. N. Am. Ured. *2651*, *2652;* Ellis & Ev. Fungi Columb. *271;* Ellis & Ev. N. Am. Fungi *2709*.

300. **Dicaeoma Stipae.**

Add the hosts, under Carduaceae:

Erigeron pumilus Nutt., Wyoming.
Hymenopappus arenosus A. Heller, Colorado.
Sideranthus grindelioides (Nutt.) Rydb. (*Aplopappus Nuttallii* T. & G.), Colorado.
Tetraneuris arizonica Greene (*Actinea Osterhoutii* A. Nelson), Colorado, Utah.
Townsendia grandiflora Nutt., Colorado.

Add the hosts, under Poaceae:
Stipa minor (Vasey) Scribn., California.
Stipa neo-mexicana (Thunb.) Vasey, Colorado.

Add the exsiccati: Barth. N. Am. Ured. *3170*, *3269*, *3369;* Brenckle, Fungi Dak. *201a*, *468*.

302. **Dicaeoma scaber.**

Add the synonym: *Puccinia scaber* Barth. N. Am. Ured. *2560*. 1922.

Add the illustrations: Sydow, Monog. Ured. **1**: *pl. 42*, *f. 552;* Bull. Torrey Club **32**: 38. *f. 3*.

Add the exsiccati: Barth. N. Am. Ured. *2560*, *2963*, *2964*, *3074*, *3360*.

302. **Dicaeoma micranthum.**

Add the hosts, under Grossulariaceae:

Grossularia inermis (Rydb.) Cov. & Britt. (*Ribes inermis* Rydb., *R. vallicola* Greene), Colorado.
Ribes aureum Pursh (*Chrysobotrya aurea* Rydb.), Nebraska, Wyoming.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 41, f. 536.*
Add the exsiccati: Barth. N. Am. Ured. *2456, 2457, 3470.*

303. **Dicaeoma Sporoboli.**

In the description of the urediniospore-pores the number should read: " 3, sometimes 4 or 6"; and in the description of the teliospores the size should read: " 15–29 by 27–55 μ."
Add the host, under Poaceae: *Sporobolus asper* (Michx.) Kunth (*S. longifolius* Wood), North Dakota.
Add the exsiccati: Seym. & Earle, Econ. Fungi *88.*

303. **Dicaeoma verbenicola.**

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 42, f. 550.*
Add the exsiccati: Barth. N. Am. Ured. *2570, 3373.*

304. **Dicaeoma simulans.**

Add the synonym: *Puccinia simulans* Barth. N. Am. Ured. *32 emend.* 1922.
Add the illustration: Bull. Torrey Club **32**: 39. *f. 5.*
Add the exsiccati: Barth. N. Am. Ured. *2966;* Vesterg. Micr. Rar. Sel. *959.*

305. **Dicaeoma Sarcobati.**

Add the synonyms: *Puccinia thalassica* Speg. Anal. Mus. Nac. Buenos Aires **6**: 225. 1899. *Puccinia Sarcobati* Bethel; Barth. N. Am. Ured. *2464.* 1921.
Omit *Musineon divaricatum* from the hosts under Brassicaceae, to which family it does not belong; the relationship of the fungus is uncertain.
Add the host, under Chenopodiaceae: *Spinacia oleracea* L., Arizona, Washington.
Insert, after the hosts under Allioniaceae:

On Aizoaceae:
Sesuvium sessile Pers., Texas.

Add the host, under Alsinaceae: *Alsine media* L. (*Stellaria media* Vill.), Colorado.
Add the hosts, under Brassicaceae:
Camelina microcarpa Andrz., Colorado, Utah.
Cheirinia repanda (L.) Link (*Erysimum repandum* L.), Utah.
Hutchinsia procumbens (L.) Desv., Utah.
Lepidium simile A. Heller, Utah.
Raphanus sativus L., Arizona.

Add the host, under Capparidaceae: *Peritoma luteum* (Hook.) Raf. (*Cleome lutea* Hook.), Arizona.
Replace the host under Loasaceae by:

Acrolasia albicaulis (Dougl.) Rydb. (*Mentzelia albicaulis* Dougl.), Nevada.
Acrolasia congesta (Nutt.) Rydb. (*Mentzelia congesta* Nutt.), Nevada.
Nuttallia pumila (Nutt.) Greene (*Mentzelia pumila* Nutt.), Colorado.
Nuttallia Rusbyi (Wooton) Rydb. (*Mentzelia Rusbyi* Wooton), Colorado.

Add the hosts, under Polemoniaceae:

Gilia leptomeria A. Gray, Colorado.
Gilia longiflora (Torr.) G. Don, Colorado.

Insert, after the hosts under Solanaceae:

On Plantaginaceae:
Plantago eriopoda Torr., Saskatchewan.

Add the hosts, under Poaceae:

(?) *Pleuraphis mutica* Buckl. (*Hilaria mutica* Benth.), New Mexico.
(?) *Scleropogon brevifolius* Phil. (*S. Karwinskyanus* Benth.), New Mexico.

Omit from the exsiccati: Barth. Fungi Columb. *3846;* Barth. N. Am. Ured. *643;* Brenckle, Fungi Dak. *204.*
Add the exsiccati; Barth. N. Am. Ured. *2464, 2465, 2466, 2467, 2468, 2678, 2866, 2962, 3071, 3072, 3073, 3164, 3165, 3360, 3361, 3362, 3474, 3475, 3476;* Brenckle, Fungi Dak. *469.*

308. **Dicaeoma hibisciatum.**

Change date for *Aecidium Malvastri* from "1881" to "1891."

Add the synonyms: *Puccinia subglobosa* Speg. An. Mus. Nac. Buenos Aires **19**: 300. 1909. Not *P. subglobosa* Dietel & Holway, 1901. *Puccinia Spegazziniella* Sacc. & Trav.; Sacc. Syll. Fung. **20**: 627. 1911.

Add the hosts, under Malvaceae:

Gossypium barbadense L., Arizona.
Sphaeralcea Fendleri A. Gray, Arizona.
Sphaeralcea grossulariaefolia (H. & A.) Rydb., Arizona.

Omit " Colorado " after *Callirhoë alceoides*.

Insert, after the telial description, the paragraph:

This species is morphologically identical in its uredinia and telia, except in septation of the teliospores, with *Nigredo Epicampis* (Dietel & Holway) Arth. The two forms also occur on similar hosts, and should eventually be united under one name.

Omit *Muhlenbergia Richardsonis* (the final letter is s and not i) from the hosts under Poaceae, for the name is entered as a synonym after *M. squarrosa*, to which the Montana material is now referred; the North Dakota material has been redetermined as *M. cuspidata*.

Add the hosts:

Limnodea arkansana (Nutt.) L. H. Dewey, Texas.
Sporobolus Buckleyi Vasey, Texas.

Add the illustrations: Sydow, Monog. Ured. **1**: *pl. 43, f. 529; pl. 42, f. 546; pl. 43, f. 549;* Bull. Torrey Club **32**: 38. *f. 4.*

Add the exsiccati: Barth. N. Am. Ured. *2365, 2554, 2555, 2561, 2661, 2666, 2855, 2946, 2971, 3057, 3156, 3166, 3172, 3250;* Brenckle, Fungi Dak. *116a;* Ellis & Ev. N. Am. Fungi *2401;* Vesterg. Micr. Rar. Sel. *1121, 1126, 1130.*

310. **Dicaeoma amphigenum.**

Omit, under Smilac[ac]eae, "Illinois" after *Smilax hispida*, and add: *Smilax Bona-nox* L., Oklahoma.

Add the host, under Poaceae: *Calamovilfa gigantea* (Nutt.) Scribn. & Merr. (*Calamagrostis gigantea* Nutt.) Colorado.

Add the exsiccati: Barth. N. Am. Ured. *2825, 2926, 3222.*

311. **Dicaeoma pygmaeum.**

Add the synonym: *Pleomeris pygmaea* Sydow, Ann. Myc. **19**: 171. 1921.

Add the host: *Melica subulata* (Griseb.) Scribn., California.

311. **Dicaeoma holcinum.**

Add the synonym: *Pleomeris holcina* Sydow, Ann. Myc. **19**: 171. 1921.

312. **Dicaeoma monoicum.**

Substitute **Parryi** for the specific name " *monoicum*," other portions of the citation remaining the same.

Add the synonyms: *Aecidium Parryi* Peck, Am. Nat. **8**: 215. 1874. *Dicaeoma monoicum* Arth. & Fromme, N. Am. Flora **7**: 312. 1920.

Add the hosts, under Brassicaceae:

Arabis Bolanderi S. Wats., California.
Arabis Nuttallii B. L. Robinson, British Columbia.
Thelypodium linearifolium S. Wats., Arizona.

Add the hosts, under Poaceae:

Stipa Elmeri Piper & Brodie, Nevada.
Stipa occidentalis Thurb., California.

Add the exsiccati: Barth. N. Am. Ured. *2458, 2553, 2766, 2954, 2955, 3056, 3260.*

313. **Dicaeoma Rhamni.**

Omit the synonym: *Aecidium Allenii* G. W. Clinton; and add *Solenodonta coronata* Sydow, Ann. Myc. **19**: 174. 1921.

Omit, among the hosts under Elaeagnaceae, *Lepargyraea argentea*, and "Michigan" and "New York" after *L. canadensis*, which localities appear under *Dicaeoma Allenii* (page 786).

Add the hosts, under Poaceae:

Agropyron tenerum Vasey, Saskatchewan.
Bromus ciliatus L., New York; Saskatchewan.
Bromus polyanthus Scribn., Colorado.
Calamagrostis aleutica Bong., Washington.
Calamagrostis elongata (Kearney) Rydb., Saskatchewan.
Calamagrostis inexpansa A. Gray, Saskatchewan.
Calamagrostis neglecta (Ehrh.) Gaertn., Wyoming.
Elymus canadensis L., Saskatchewan.
Panicularia grandis (S. Wats.) Nash (*P. americana* MacM., *Glyceria grandis* S. Wats.), North Dakota.
Panicularia nervata (Willd.) Kuntze (*Glyceria nervata* Trin.), Idaho.
Poa arachnifera Torr., Alabama.
Trisetum spicatum (L.) Richter (*T. toluccense* Kunth, *T. subspicatum* Beauv.), Colorado.

Add the illustration: Fl. Ital. Crypt. Ured. *f. 74f.*

Omit the exsiccati: Barth. N. Am. Ured. *1801, 2001, 2772;* Ellis & Ev. Fungi Columb. *1702;* Ellis & Ev. N. Am. Fungi *1815;* D. Griff. W. A. M. Fungi *297;* all now referred to *Dicaeoma Allenii.*

Add the exsiccati: Barth. N. Am. Ured. *2463, 2672, 2673, 2674, 2675, 2676, 2677, 2772, 2860, 2861, 2960, 3066, 3067, 3162, 3265, 3266;* Brenckle, Fungi Dak. *494;* Rav. Fungi Am. *726;* Thaxter, Rel. Farl. *249a–c.*

315. **Dicaeoma Periclymeni.**

Add the synonym: *Solenodonta Festucae* Sydow, Ann. Myc. **19**: 174. 1921.

316. **Dicaeoma Fraxini.**

Add the host, under Poaceae: *Spartina Bakeri* Merr., Florida.

Add the exsiccati: Barth. N. Am. Ured. *2545, 2755, 3244, 3346, 3457;* Thaxter, Rel. Farl. *272a, b;* Vesterg. Micr. Rar. Sel. *1124.*

317. **Dicaeoma Distichlidis.**

Add the exsiccati: Barth. N. Am. Ured. *2752, 2753, 2840, 2937, 3240.*

318. **Dicaeoma Cephalanthi.**

Add the synonym: *Puccinia Cephalanthi* Barth. N. Am. Ured. *261 emend.* 1922.

Omit, among the hosts under Apocynaceae, "Oklahoma" after *Apocynum cannabinum*, and insert it after *A. sibiricum.*

Add the host, under Asclepiadaceae: *Asclepias speciosa* Torr., South Dakota.

Add the host, under Poaceae: *Spartina alternifolia glabra* (Muhl.) Fernald (*S. glabra* Muhl., *S. glabra alterniflora* Merr.), New York.

Add the exsiccati: Barth. N. Am. Ured. *2655;* Brenckle, Fungi Dak. *566.*

318. **Dicaeoma Chloridis.**

Change the citation for *Puccinia Chloridis* Speg. to: Rev. Arg. Hist. Nat. **1**: 172. 1891.

Add the exsiccati: Barth. N. Am. Ured. *2344.*

320. **Dicaeoma vexans.**

Add the synonym: *Puccinia aristidicola* P. Henn. Hedwigia **35**: 243. 1896.

Add the exsiccati: Barth. N. Am. Ured. *2871, 3078, 3274.*

320. **Dicaeoma Jamesianum.**

Omit, among the hosts under Asclepiadaceae, "Colorado" after *Asclepias verticillata*, and add: *Vincetoxicum* sp., Salvador.

Add the exsiccati: Barth. N. Am. Ured. *2550, 2854;* Brenckle, Fungi Dak. *464.*

321. **Dicaeoma Leptochloae.**

Add the synonym: *Puccinia subtilipes* Speg. Anal. Mus. Nac. Buenos Aires **31**: 386. 1922.

321. **Dicaeoma kansense.**

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 40, f. 524.*

322. **Dicaeoma rubellum.**

Add the exsiccati: Barth. N. Am. Ured. *462.*

323. **Dicaeoma Windsoriae.**

Change the distribution to read: Northeastern New York to Ontario, Wisconsin, Alabama, and Texas.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 40, f. 526.*

Omit from the exsiccati: Seym. & Earl. Econ. Fungi *88;* and add: Barth. N. Am. Ured. *2376, 2573, 2872, 3079.*

324. **Dicaeoma Eatoniae.**

Reduce this name to synonymy, and replace it by **Dicaeoma Myosotidis** (Burr.) Arthur & Fromme.

Add also the synonyms: *Aecidium Myosotidis* Burr. Bot. Gaz. **9**: 189. 1884. *Pleomeris Eatoniae* Sydow, Ann. Myc. **19**: 171. 1921.

Add after the hosts under Ranunculaceae:

ON BORAGINACEAE:
Myosotis virginica (L.) B.S.P. (*M. verna* Nutt.), Illinois, Indiana, Missouri, Wisconsin.

Add the exsiccati: Barth. N. Am. Ured. *2348, 2938;* Ellis & Ev. N. Am. Fungi *1832.*

325. **Dicaeoma Koeleriae.**

Add the synonym: *Pleomeris Koeleriae* Sydow, Ann. Myc. **19**: 171. 1921.

Omit, among the hosts under Berberidaceae, after *Mahonia Aquifolium* "Oregon" and "British Columbia," and add Wyoming.

Add the exsiccati: Barth. N. Am. Ured. *2763.*

326. **Dicaeoma Liatridis.**

Add the synonym: *Puccinia Koeleriae-Liatridis* J. J. Davis, Trans. Wis. Acad. **21**: 254. 1924.

Add the host, under Poaceae: *Agrostis exarata* Trin. (*A. microphylla* Steud.), Colorado.

327. **Dicaeoma epiphyllum.**

Add the synonyms: *Aecidium aurantiacum* Bon. Abh. Nat. Ges. Halle **5**: 208. 1860. *Uredo Poae-sudeticae* Westend. Bull. Acad. Belg. II. **11**: 650. 1861. *Puccinia exigua* Dietel, Hedwigia **36**: 29. 1897. Not *P. exigua* Eriksson, 1895. *Puccinia exigua* Dietel, Hedwigia **36**: 299. 1897. *Uredo paulensis* P. Henn. Hedwigia **41**: 297. 1902. *Pleomeris Poarum* Sydow, Ann. Myc. **19**: 171. 1921.

Add the hosts, under Poaceae:

Festuca elatior L., Oregon.
Poa crocata Michx., Montana; Alberta.
Poa lucida Vasey, Wyoming.
Poa trivialis L., Washington.
Poa Wheeleri Vasey, Wyoming.
Triselum spicatum (L.) Beauv. (*T. toluccense* Kunth, *T. subspicatum* Beauv.), California.

Add the exsiccati: Barth. N. Am. Ured. *2433, 2844, 2940, 3039, 3141, 3343, 3344.*

328. **Dicaeoma abundans.**

Add the host, under Caprifoliaceae: *Symphoricarpos rotundifolius* A. Gray, Wyoming.

Add the host, under Poaceae: *Festuca Elmeri* Scribn. & Merr., California.

Add the exsiccati: Barth. N. Am. Ured. *2530, 2641, 2642, 3027, 3028, 3124, 3333;* Sydow, Ured. *2716.*

329. **Dicaeoma Piperi.**

Add the synonym: *Pleomeris Piperi* Sydow, Ann. Myc. **19**: 171. 1921.

Add the host: *Festuca megalura* Nutt., California.

Add: EXSICCATI: Barth. N. Am. Ured. *2459.*

330. **Dicaeoma Pattersonianum.**

Substitute for the line pertaining to pycnia and aecia:

O. Pycnia amphigenous, few, preceding the aecia in crowded oval groups 0.2–0.5 mm. long, honey-yellow, punctiform, inconspicuous, in section globoid or flask-shaped, 100–130 μ broad by 110–135 μ high; ostiolar filaments spreading, up to 65 μ long.

I. Aecia amphigenous, densely gregarious in oval or elongate groups on pale-yellow spots up to 3 mm. in length, short-cylindric, 0.2–0.4 mm. high; peridium straw-colored, the margin erect, erose; peridial cells squarish or rhombic, 19–26 by 29–40 μ, somewhat overlapping, the outer wall 8–10 μ thick, conspicuously transversely striate, smooth, the inner wall 3–5 μ thick, prominently tuberculate; aeciospores globoid or broadly ellipsoid, 18–26 by 21–32 μ; wall colorless, 2–3 μ thick, finely verrucose.

ON ALLIACEAE:
Triteleia grandiflora Lindl. (*Brodiaea Douglasii* S. Wats.), Idaho, Utah, Washington.

Change the distribution to read: Montana and eastern Washington to Utah and New Mexico.

Insert: ILLUSTRATIONS: Sydow, Monog. Ured. **1**: *pl. 43, f. 555;* Proc. Ind. Acad. **1921**: *pl. 1, f. A.*

330. **Dicaeoma procerum.**

Add the synonym: *Pleomeris procera* Sydow, Ann. Myc. **19**: 171. 1921.

330. **Dicaeoma montanense.**

Add the synonym: *Pleomeris montanensis* Sydow, Ann. Myc. **19**: 171. 1921.

Add the host, under Poaceae: *Agropyron albicans* Scribn. & Smith, Alberta.

Omit *Elymus robustus* from the hosts under Poaceae, as it is a synonym under *E. canadensis.*

Change the distribution by omitting the words, "and southern California," and adding: also in South America.

Insert: ILLUSTRATION: Bot. Gaz. **28**: 420. *f. 4;* 421. *f. 5.*

331. **Dicaeoma Asperifolii.**

Add the synonym: *Pleomeris dispersa* Sydow, Ann. Myc. **19**: 171. 1921.

Omit from the line pertaining to the host under Boraginaceae the words "also in Europe," and add the hosts:

Lycopsis arvensis L. (*Anchusa arvensis* Bieb.), Indiana.
Lycopsis capensis Thunb. (*Anchusa capensis* Thunb.), Indiana.

Add to the last sentence under distribution: Those recorded for Indiana, except for *Lycopsis capensis*, were field collections found after throwing rye straw over the host plants.

Add the illustrations: Eriksson & Henn. Getreider. *pl. 10, f. 110–112, 114–116; pl. 11, f. 119–123.*

Add the exsiccati: Barth. N. Am. Ured. *2339, 2536.*

332. **Dicaeoma apocryptum.**

Add the synonym: *Pleomeris apocrypta* Sydow, Ann. Myc. **19**: 171. 1921.

Omit from the hosts under Boraginaceae: *Myosotis virginica*, which should appear under *D. Eatoniae*, page 324, and add:

Lithospermum canescens (Michx.) Lehm., North Dakota.
Mertensia lanceolata (Pursh) DC., Colorado.
Mertensia subcordata Greene, Idaho.
Phacelia sericea (Graham) A. Gray, Wyoming.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 39, f. 520.*

Add the exsiccati: Barth. N. Am. Ured. *2928, 3031, 3127, 3225, 3335;* Brenckle, Fungi Dak. *516, 516a.*

333. **Dicaeoma Clematidis.**

Add the synonyms: *Aecidium Hepaticae* Beck, Verh. Zool.-Bot. Ges. Wien **30**: 27. 1880. *Aecidium Isopyri* Schroet. Krypt.-Fl. Schles. 3^1: 378. 1887. *Uredo Chascolytri* Dietel & Neger, Bot. Jahrb. **27**: 15. 1899. *Puccinia brachypus* Speg. Anal. Mus. Nac. Buenos Aires III. **1**: 61. 1902. *Uredo auletica* Speg. Anal. Mus. Nac. Buenos Aires III. **1**: 65. 1902. *Aecidium Hellebori* Ed. Fisch. Beitr. Krypt. Schweiz 2^2: 526. 1904. *Pleomeris triticina* Sydow, Ann. Myc. **19**: 171. 1921. *P. agropyrina* Sydow, *loc. cit.* *P. persistens* Sydow, *loc. cit.* *P. Agrostidis* Sydow, *loc. cit.* *P. perplexans* Sydow, *loc. cit.*

Add the hosts, under Ranunculaceae:

Actaea arguta Nutt., Alaska, Washington.
Actaea eburnea Rydb., Alaska.
Anemone globosa Nutt., Montana, South Dakota; Alberta, Saskatchewan.
Delphinium tricorne Michx., Nebraska.
Ranunculus aleophilus A. Nelson, Idaho.
Ranunculus affinis R. Br., Alberta.
Ranunculus cardiophyllus Hook., Alberta.
Thalictrum polycarpum S. Wats., California.

Omit "Wisconsin" after *Anemone cylindrica.*

Add the hosts, under Poaceae:

Agropyron albicans Scribn. & Smith, Alberta.
Agropyron flexuosum Piper, Idaho.
Agropyron Richardsoni (Trin.) Schrad., Manitoba.
Avena falua L., California.
Bromus rigidus Roth, California.
Elymus arenarius L., Washington.
Elymus curvatus Piper, Manitoba.
Elymus diversiglumis Scribn. & Ball, Saskatchewan.
Elymus Macounii Vasey, Alberta.
Poa lucida Vasey, Colorado.
Poa nervosa (Hook.) Vasey, Montana.

Omit the synonym "*E. robustus* Scribn. & Smith" after *Elymus condensatus*, and place it after *E. canadensis.*

Add the illustrations: Bot. Gaz. **28**: 419. *f. 2;* Eriksson & Henn., Getreider. *pl. 10, f. 109, 113, 117, 118;* Jour. Agr. Res. **22**: *pl. 21;* Sydow, Monog. Ured. **1**: *pl. 39, f. 513; pl. 41, f. 537; pl. 43, f. 559;* **3**: *pl. 7, f. 73.*

Add the exsiccati: Barth. N. Am. Ured. *1632, 2370, 2430, 2472, 2542, 2656, 2657, 2681, 2744, 2745, 2746, 2747, 2748, 2749, 2834, 2835, 2936, 2970, 3135, 3136, 3137, 3138, 3236, 3237, 3257, 3340, 3341;* D. Griff. W. Am. Fungi *20* in part, *21, 35;* Thaxter, Rel. Farl. *207;* Vesterg. Micr. Rar. Sel. *1562.*

337. **Dicaeoma Impatientis.**

Add the exsiccati: Barth. N. Am. Ured. *2360, 2949, 3354, 3355, 3466;* Roum. Fungi Gall. *3867;* Shear, N. Y. Fungi *323.*

338. **Dicaeoma glumarum.**

Add the synonym: *Pleomeris glumarum* Sydow, Ann. Myc. **19**: 171. 1921.

Add the hosts:

Aegilops cylindrica Host, Washington.
Agropyron Smithii Rydb. (*A. occidentale* Scribn.), Colorado.
Bromus unioloides H.B.K., California.

Add the exsiccati: Barth. N. Am. Ured. *2435, 2758, 3040.*

339. **Dicaeoma Hordei.**

Add the synonym: *Pleomeris Hordei* Sydow, Ann. Myc. **19**: 171. 1921.

339. **Dicaeoma anomalum.**

Add the synonym: *Pleomeris simplex* Sydow, Ann. Myc. **19**: 171. 1921.

Substitute, for the line under Liliaceae: *Ornithogalum umbellatum* L., Indiana; also in Europe and Asia.

Add, under distribution: The aecia recorded for Indiana were field collections found after throwing barley straw over the host plants.

Add the illustrations: Briosi & Cavara, Funghi Paras. *f. 159;* Eriksson & Henn. Getreider. *pl. 11, f. 124–128;* Fl. Ital. Crypt. Ured. *f. 74e.*

340. **Dicaeoma subdigitatum.**

Add the synonym: *Solenodonta subdigitata* Sydow, Ann. Myc. **19**: 174. 1921.

340. **Dicaeoma Arundinariae.**

Add the exsiccati: Barth. N. Am. Ured. *2929.*

340. **Dicaeoma melanocephalum.**

Add the hosts:

Bambos aureo-striata Regel, Florida.
Phyllostachys bambusoides Sieb. & Zucc., Georgia.
Phyllostachys Newinii hupehensis Rendle, Florida.

341. **Dicaeoma ignavum.**

Add the synonym: *Puccinia* (?) *ignava* Arth. Mycologia **14**: 17. 1922.

341. **Dicaeoma obtectum.**

Add the synonym: *Pleomeris obtecta* Sydow, Ann. Myc. **19**: 171. 1921.

Add the host, under Carduaceae: *Bidens trichosperma* (Michx.) Britton, Indiana.

Add the exsiccati: Barth. N. Am. Ured. *2956, 3157, 3158;* Brenckle, Fungi Dak. *492;* Thaxter, Rel. Farl. *265.*

342. **Dicaeoma McClatchieanum.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 39, f. 511.*

Add the exsiccati: Barth. N. Am. Ured. *2664.*

343. **Dicaeoma angustatum.**

Add the host, under Lamiaceae: *Lycopus asper* Greene, Saskatchewan.

Add the host, under Cyperaceae: *Eriophorum angustifolium* Roth, Saskatchewan.

Add the exsiccati: Barth. N. Am. Ured. *2337, 2423, 2424, 2826;* Thaxter, Rel. Farl. *239a, b.*

344. **Dicaeoma Eriophori.**

Substitute for the last host under Carduaceae: *Senecio triangularis* Hook., British Columbia.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 38, f. 509.*

Add the exsiccati: Barth. N. Am. Ured. *3456;* Thaxter, Rel. Farl. *254.*

344. **Dicaeoma canaliculatum.**

Add the synonym: *Pleomeris canaliculata* Sydow, Ann. Myc. **19**: 171. 1921.

Add the exsiccati: Barth. N. Am. Ured. *2541, 2653, 2654, 2741, 2742, 2743, 2832, 2934, 2935, 3036, 3232, 3453.*

345. **Dicaeoma Cyperi.**

Add the synonyms: *Uredo Kyllingiae* P. Henn. Hedwigia **35**: 256. 1896. *Pleomeris Cyperi* Sydow, Ann. Myc. **19**: 171. 1921.

Add the hosts:

Cyperus pseudovegetus Steud., Oklahoma.
Cyperus surinamensis Rottb., Cuba.

Insert: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 580, *f. 85.*

Add the exsiccati: Barth. N. Am. Ured. *2751;* Brenckle, Fungi Dak. *488.*

346. **Dicaeoma Cyperi-tagetiformis.**

Add the host: *Cyperus brunneus* Sw., Porto Rico.

347. **Dicaeoma antioquiense.**

Add: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 473, *f. 14.*

347. **Dicaeoma Eleocharidis.**

Substitute for the first host under Cyperaceae: *Eleocharis caribaea* (Rottb.) Blake, Cuba; Porto Rico; and add *Eleocharis arenicola* Torr., Texas.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 38, f. 508.*

Add the exsiccati: Barth. N. Am. Ured. *2349, 2544, 2754, 2939;* Thaxter, Rel. Farl. *252.*

348. **Dicaeoma incompositum.**

Omit the host: *Eleocharis geniculata.*

348. **Dicaeoma Fuirenae.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 38, f. 510.*

349. **Dicaeoma Scleriae.**

Add the host: *Scleria microcarpa* Nees, Porto Rico.

350. **Dicaeoma Cladii.**

Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 38, f. 505.*

350. **Dicaeoma Fimbristylidis.**

Add the synonym: *Pleomeris Fimbristylidis* Sydow, Ann. Myc. **19**: 171. 1921.

Insert: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 477, *f. 16.*

351. **Dicaeoma (?) Dichromenae.**

Add: ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 581, *f. 86.*

351. **Dicaeoma angustatoides.**

Reduce the host *Rynchospora aurea* Vahl to synonymy under *R. corymbosa* (L.) Britton

Add: ILLUSTRATION: Bull. Torrey Club **36**: 549–551, *f. 1–4.* EXSICCATI: Barth. N Am. Ured. *2425, 3030.*

352. Insert:

121a. **Dicaeoma pedicularіatum** (Link) Arthur & Kern.

Aecidium Pedicularis Lib. Mém. Soc. Nat. Mosc. **5**: 76. 1817. Not *Dicaeoma Pedicularis* Kuntze, 1906.
Caeoma Pedicularis Schlecht. Fl. Berol. **2**: 113. 1824.
Caeoma pedicularіatum Link, in Willd. Sp. Pl. **6**[2]: 47. 1825.
Puccinia paludosa Plowr. Monog. Brit. Ured. Ustil. 174. 1889.
Puccinia Pedicularis Lagerh. Tromsö Mus. Aarsh. **17**: 68. 1895.

O. Pycnia amphigenous, few, inconspicuous, golden-yellow, globoid or depressed-globoid, 80–130 μ broad by 65–95 μ high; ostiolar filaments short.

I. Aecia hypophyllous and caulicolous, in irregular or elongate groups 3–10 mm. across, cupulate; peridium colorless, the margin slightly recurved, lacerate or erose; peridial cells rectangular, 14–18 by 18–22 μ, slightly overlapping, the outer wall 4–7 μ thick, transversely striate, smooth, the inner wall 1.5–2.5 μ thick, finely verrucose; aeciospores globoid or ellipsoid, 15–17 by 16–20 μ; wall colorless, thin, 1 μ or less, very finely verrucose, appearing smooth when wet.

ON SCROPHULARIACEAE:
Pedicularis mexicana Zucc., Mexico (state).

II. Uredinia hypophyllous, scattered, ellipsoid or oblong, 0.5–1 mm. in length, tardily naked, cinnamon-brown, pulverulent, ruptured epidermis conspicuous; urediniospores ellipsoid or obovoid, 19–23 by 23–32 μ; wall golden- or light cinnamon-brown, 2–2.5 μ thick, moderately and finely echinulate, the pores 2–4, equatorial.

III. Telia hypophyllous, oblong or linear, 1–3 mm. long, occasionally confluent to form striae, early naked, compact, dark chestnut-brown, ruptured epidermis conspicuous; teliospores obovate or clavate, 16–19 by 40–58 μ, rounded or obtuse above, narrowed below, usually strongly constricted at septum; wall light cinnamon-brown, darker above, 1–1.5 μ thick, much thicker above, 5–10 μ, smooth; pedicel nearly or quite colorless, half length of spore.

ON CYPERACEAE:
Carex sp. in Europe, not yet found in America.
TYPE LOCALITY: Ruthenia, on *Pedicularis sylvatica.*
DISTRIBUTION: One locality near the City of Mexico; also in Europe.
ILLUSTRATIONS: Mém. Soc. Nat. Mosc. **5**: *pl. 5, f. 1;* Grove, Brit. Rust Fungi *f. 192;* Beitr. Krypt. Schweiz **2**[2]: *f. 203.*

353. **Dicaeoma atrofuscum.**

Change the page number for the first citation from "343" to "344."
Insert: ILLUSTRATION: Bull. Torrey Club **32**: 40, *f. 8.*
Add the exsiccati: Barth. N. Am. Ured. *3035.*

354. **Dicaeoma minutum.**

Change the citation for this name to read: Arth. Résult. Sci. Congr. Bot. Vienne 344. 1906.
Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 38, f. 502.*

354. **Dicaeoma Lysimachiae.**

Add the synonym: *Dicaeoma Limosae* Sydow, Ann. Myc. **20**: 118. 1922.
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 37, f. 493.*
Add the exsiccati: Barth. N. Am. Ured. *3256.*

355. **Dicaeoma Parnassiae.**

Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 37, f. 494.*

355. **Dicaeoma Grossulariae.**

Append to the note at top of page 357: Another race representing the four-pored form with one-celled teliospores is given under the name *Nigredo valens* (Kern) Arth.

Omit *Carex pachystachya* from the hosts under Cyperaceae, also change "Oklahoma" to "New York" after *Carex brunnescens*, and add:

Carex ablata L. H. Bailey, Idaho.
Carex colorata Mackenzie, Ontario.
Carex gymnoclada Holm, Montana.
Carex neurophora Mackenzie, Idaho.
Carex oxycarpa Holm, Idaho.
Carex podocarpa R. Br., Idaho.
Carex praegracilis W. Boott, North Dakota.
Carex tenuiflora Wahl., New York.

Add the exsiccati: Barth. N. Am. Ured. *2353, 2439, 2440, 2441, 2442, 2659, 2760, 2848, 2942, 3144, 3145, 3351, 3459, 3460, 3461, 3462, 3463, 3464;* Brenckle, Fungi Dak. *462, 462a, 489, 489a;* Thaxter, Rel. Farl. *256a–c.*

358. **Dicaeoma Urticae.**

Add the hosts, under Urticaceae:

Urtica Breweri S. Wats., California.
Urtica dioica L., Massachusetts; Ontario.

Among the hosts, under Cyperaceae, omit "Pennsylvania" after *Carex viridula*, replace "Utah" with "Iowa" after *Carex aquatilis*, and add:

Carex cryptolepis Mackenzie, Wisconsin.
Carex Mertensii Prescott, Washington.

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 73;* Bull. Torrey Club **32**: 40, *f. 9.*
Add the exsiccati: Barth. N. Am. Ured. *1275, 2372, 2474, 2568, 2683, 2684, 2777, 2778, 2973, 3174, 3272, 3372;* D. Griff. W. Am. Fungi *52, 66a;* Sydow, Ured. *2559;* Thaxter, Rel. Farl. *245.*

359. Insert:

130a. **Dicaeoma Allenii** (G. W. Clinton) Arthur & Fromme.

Aecidium Allenii G. W. Clinton; Peck, Ann. Rep. N. Y. State Mus. **24**: 93. 1872.
Puccinia Caricis-Shepherdiae J. J. Davis, Trans. Wis. Acad. **21**: 301. 1924.

O. Pycnia epiphyllous, usually few or none, sometimes many and loosely scattered, small, punctiform, brown, globoid, 110–130 μ in diameter; ostiolar filaments up to 100 μ long.

I. Aecia hypophyllous, in large, uncrowded, indefinite groups, 5–10 cm. across, on somewhat larger, pale, unthickened spots, cupulate or cylindric, 0.2–0.3 mm. broad by 0.3–1 mm. high; peridium colorless, the margin recurved and irregularly lacerate; peridial cells rhombic, 16–23 by 23–26 μ in face view, greatly overlapping, the inner wall

3–4 μ thick, coarsely verrucose, the outer wall 4–7 μ thick, smooth, transversely striate; aeciospores globoid or broadly ellipsoid, 17–23 by 19–27 μ; wall about 1.5 μ thick, colorless, closely and minutely verrucose.

ON ELAEAGNACEAE:
Lepargyraea argentea (Nutt.) Greene (*Shepherdia argentea* Nutt.), Colorado, Montana, Nebraska, Wyoming; Saskatchewan.
Lepargyraea canadensis (L.) Greene (*Shepherdia canadensis* Nutt.), Michigan, New York, South Dakota, Wisconsin; Newfoundland, Ontario, Saskatchewan.

II. Uredinia amphigenous or culmicolous, scattered, oval or oblong, 0.3–0.5 mm. long, early naked, golden-brown, somewhat pulverulent, ruptured epidermis evident; urediniospores broadly ellipsoid or obovoid, 18–28 by 27–35 μ; wall golden-brown, 1.5–2.5 μ thick, moderately and finely echinulate, the pores 2–4, equatorial, not conspicuous.

III. Telia amphigenous and culmicolous, scattered, oval, oblong, or linear, 0.3–2 mm. long, early naked, pulvinate, dark-brown, ruptured epidermis noticeable; teliospores oblong-clavate, 17–24 by 42–56 μ, more or less constricted at septum, rounded or obtuse above, narrowed below; wall chestnut-brown, 1.5–2.5 μ thick, darker and much thicker above, 10–15 μ, smooth; pedicel one half to once length of spore, tinted or nearly colorless.

ON CYPERACEAE:
Carex eburnea Boott (*C. setifolia* Britton), Wisconsin; Ontario, Quebec.
Carex viridula Michx., Michigan, Pennsylvania.
TYPE LOCALITY: Buffalo, New York, on *Shepherdia canadensis*.
DISTRIBUTION: Northern border of the United States and adjacent Canada, from Newfoundland to western South Dakota, between the parallels of 43° and 48° north latitude.
EXSICCATI: Barth. N. Am. Ured. *1801, 2001, 2072, 2861, 3233, 3234;* Ellis & Ev. Fungi Columb. *1702;* Ellis & Ev. N. Am. Fungi *1815;* D. Griff. W. Am. Fungi *297.*

359. **Dicaeoma microsorum.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 38, f. 504.*

360. **Dicaeoma minutissimum.**

In the description of the urediniospores, the size should read: 12–18 by 16–21 μ.
Add the exsiccati: Ellis & Ev. Fungi Columb. *197.*

360. **Dicaeoma Dracunculi.**

Reduce this name to synonymy, and substitute: **Dicaeoma Martianoffianum** (Thüm.) Arthur.

Add the synonym: *Aecidium Martianoffianum* Thüm. Bull. Soc. Nat. Mosc. **52**: 135. 1877.

Add the host, under Carduaceae: *Artemisia Purshiana* Besser, South Dakota; Alberta.
Under the type locality, change the host to read *Artemisia glauca.*

Add the exsiccati: Barth. N. Am. Ured. *2473, 2682, 2972, 3076, 3173, 3271, 3371, 3478;* Ellis & Ev. N. Am. Fungi *2219a.*

362. **Dicaeoma Asterum.**

Among the synonyms, the citation for *Aecidium Asteris* Thüm. should read: Bull. Soc. Nat. Mosc. **52**: 134. 1877.

Add the synonym: *Puccinia Linosyridi-Caricis* Ed. Fischer, Beitr. Krypt. Schweiz **2**²: 275. 1904.

Add to the description of the urediniospore-pores: or sometimes equatorial.
Add the hosts, under Carduaceae:

Aster armeriaefolius Greene, Colorado.
Aster nemoralis Ait., Pennsylvania.
Aster Novae-Angliae L., Connecticut.
Aster occidentalis Nutt., Washington.

Add the host, under Cyperaceae: *Carex pachystachya* Cham., Montana, Oregon.

Add the illustration: Beitr. Krypt. Schweiz **2**²: *f. 205.*

Add the exsiccati: Barth. N. Am. Ured. *2341, 2427, 2428, 2538, 2649, 2932, 3033, 3034, 3129, 3130, 3227, 3228, 3336, 3451, 3452;* Brenckle, Fungi Dak. *485, 563;* Ellis & Ev. N. Am. Fungi *2402, 2721;* D. Griff. W. Am. Fungi *362;* Thaxter, Rel. Farl. *251.*

365. **Dicaeoma Peckii.**

Add the hosts, under Onagraceae:

Chamaenerion angustifolium (L.) Scop. (*Epilobium angustifolium* L., *E. spicatum* Lam.), Colorado; Saskatchewan.
Lavauxia triloba (Nutt.) Spach (*Oenothera triloba* Nutt.), North Dakota.

Change "*Pachylophus microglottis*" to read: *Pachylophus macroglottis.*

Add the host, under Cyperaceae: *Carex lupuliformis* Sartwell, Indiana.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 37, f. 492, 496.*

Add the exsiccati: Barth. N. Am. Ured. *2668, 3356;* Ellis & Ev. N. Am. Fungi *2885;* D. Griff. W. Am. Fungi *58.*

366. **Dicaeoma hieraciatum.**

Omit, under Cichoriaceae, *Nabalus trifoliolatus* Cass., which is transferred to *Dicaeoma atropunctum*, page 372, and add:

Agoseris parviflora (Nutt.) Greene (*Troximon parviflorum* Nutt.), Wyoming.
Crepis glauca (Nutt.) T. & G., Nevada.
Crepis intermedia A. Gray, Washington.

Omit *Carex Frankii* from the hosts under Cyperaceae, and add:

Carex atherodes Spreng. (*C. aristata* R. Br.), North Dakota.
Carex Douglasii Boott, Colorado.
Carex trichocarpa Muhl., North Dakota.

Add the exsiccati: Barth. N. Am. Ured. *2448, 2662, 3150, 3251;* D. Griff. W. Am. Fungi *66.*

368. **Dicaeoma Sambuci.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. *pl. 37, f. 491, 497.*

Add the exsiccati: Barth. N. Am. Ured. *2829, 2865, 3070, 3267, 3473;* Thaxter, Rel. Farl. *244.*

368. **Dicaeoma Caricis-strictae.**

Insert: ILLUSTRATIONS: Bull. Torrey Club **32**: 40. *f. 7;* Sydow, Monog. Ured. **1**: *pl. 38, f. 503.*

Add the exsiccati: Barth. N. Am. Ured. *2343.*

369. **Dicaeoma Trientalis.**

Add the synonym: *Puccinia Aecidii-Trientalis* Liro, Ured. Fenn. 196. 1908.

Add: EXSICCATI: Barth. N. Am. Ured. *3270, 3370.*

369. **Dicaeoma (?) Pitcairniae.**

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 35, f. 480.*

370. **Dicaeoma (?) Commelinae.**

Add the host: *Athyrocarpus persicariaefolius* (DC.) Hemsl. (*Commelina persicariaefolia* Delile), Grenada.

370. **Dicaeoma obscurum.**

Add the synonyms: *Aecidium compositarum Bellidis* Dur. & Mont.; Durieu, Expl. Sci. Algér. Bot. **1**: 308. 1848. *Aecidium Montagnei* Gonz. Frag. Bol. Soc. Esp. Hist. Nat. **14**: 239. 1914. *Aecidium Bellidis-silvestris* Sacc. Nuovo Giorn. Bot. Ital. II. **22**: 31. 1915.

Insert among the hosts under Juncaceae, as a synonym after *Juncoides comosa:* "(*Luzula comosa* E. Meyer)."

Add the illustration: Grove, Brit. Rust Fungi *f. 183.*

Add the exsiccati: Thaxter, Rel. Farl. *264.*

371. **Dicaeoma Veratri.**

Add the host, under Melanthaceae: *Veratrum californicum* Durand, California, Oregon, Washington.

Add the illustration: Fl. Ital. Crypt. Ured. *f. 72c.*

Add the exsiccati: Barth. N. Am. Ured. *2569, 2779, 2974, 3077;* Thaxter, Rel. Farl. *275.*

372. **Dicaeoma atropunctum.**

Add the synonym: ? *Aecidium Dandelionis* Schw. Schr. Nat. Ges. Leipzig **1**: 66. 1822.

Change the measurement of the aeciospores to read: "13–18 by 16–18 μ," and that of the wall, "1–1.5 μ."

Insert after the aecial description:

ON CICHORIACEAE:
? *Adopogon Dandelion* (L.) Kuntze (*Cynthia Dandelion* DC., *Krigia Dandelion* Nutt., *Tragopogon Dandelion* L.), North Carolina.
Nabalus trifoliolatus Cass. (*Prenanthes trifoliolatus* Fernald), Pennsylvania, Virginia.

Insert, after the telial description, the paragraph:

This species is correlated (as shown by Orton & Weiss, Mycologia **17**: 151. 1925) with the heteroecious rust on *Carex*, *Dicaeoma hieraciatum* (Schw.) Arth. & Kern, page 366, the aecia of the two species inhabiting the same or similar hosts, and the aeciospores, like the urediniospores and teliospores, possessing striking morphological similarities. Both species are also correlated with *Micropuccinia maculosa* (Schw.) Arth. & Jackson, page 586.

Add the illustration: Mycologia **17**: 149. *f. 1*, *pl. 17.*

372. **Dicaeoma grumosum.**

Change "334" to "344" in the page-citation for this name.

373. **Dicaeoma mutabile.**

Add the host: *Allium acuminatum* Hook., Utah.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 35*, *f. 471.*

373. **Dicaeoma Allii.**

Add the host: *Allium Heckmani* Eastw., California.

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 71a;* Sydow, Monog. Ured. **1**: *pl. 35*, *f. 473.*

Add the exsiccati: Barth. N. Am. Ured. *2644.*

374. **Dicaeoma Porri.**

Add the illustration: Grove. Brit. Rust Fungi *f. 182.*

375. **Dicaeoma granulisporum.**

Add: EXSICCATI: Barth. N. Am. Ured. *3043.*

376. **Dicaeoma Asparagi.**

Add the synonym: *Persooniella Asparagi* Sydow, Ann. Myc. **20**: 118. 1922.

Add the illustrations: Grove, Brit. Rust. Fungi *f. 180;* Fl. Ital. Crypt. Ured. *f. 71b.*

Add the exsiccati: Barth. N. Am. Ured. *2338*, *2533*, *2534*, *2535*, *2739*, *2930*, *3128;* Thaxter, Rel. Farl. *241.*

377. **Dicaeoma Smilacis.**

Add the synonym: *Persooniella Smilacis* Sydow, Ann. Myc. **20**: 118. 1922.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 35*, *f. 481.*

Add the exsiccati: Barth. N. Am. Ured. *2367*, *2562*, *2679*, *2773*, *2774*, *2867*, *2868*, *2967*, *2968*, *3167*, *3168*, *3365.*

377. **Dicaeoma** (?) **Aletridis.**

Add to the distribution: " also locally in the interior between the Great Lakes and the Mississippi River."

Add the exsiccati: Thaxter, Rel. Farl. *237.*

378. **Dicaeoma** (?) **Bomareae.**

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 34*, *f. 463.*

379. **Dicaeoma Pallor.**

Add the synonym: *Eriosporangium Pallor* Sydow, Ann. Myc. **20**: 122. 1922.

379. **Dicaeoma (?) Iridis.**
Add the illustration: Grove, Brit. Rust Fungi *f. 178.*
Add the exsiccati: Barth. N. Am. Ured. *3467;* Thaxter, Rel. Farl. *286.*

380. **Dicaeoma (?) Cannae.**
Omit "Cuba" after *Calathea lutea* and place it after *Thalia geniculata.*
Add the host, under Marantaceae: *Calathea macrosepala* K. Schum., Panama.

381. **Dicaeoma (?) Cypripedii.**
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 33, f. 450.*

381. **Dicaeoma Polygoni-amphibii.**
Add the synonym: *Aecidium Geranii-pusilli* Tranz. Trav. Mus. Bot. Acad. St.-Pétersb. **2**: 13. 1905.
Omit, among the hosts, " Ohio " after *Persicaria Hartwrightii.*
Add the illustration: Fl. Ital. Crypt. Ured. *f. 69d.*
Add the exsiccati: Barth. N. Am. Ured. *2366, 2460, 2461, 2558, 2559, 2669, 2768, 2769, 2770, 2771, 2856, 2857, 2858, 2859, 2958, 3062, 3063, 3064, 3159, 3160, 3263, 3264, 3357, 3471, 3472;* Brenckle, Fungi Dak. *565;* D. Griff. W. Am. Fungi *15;* Thaxter, Rel. Farl. *269a, b.*

382. **Dicaeoma Polygoni-vivipari.**
Add the illustration: Grove, Brit. Rust Fungi *f. 174.*

383. **Dicaeoma Bistortae.**
Add the illustrations: Grove, Brit. Rust Fungi *f. 173;* Fl. Ital. Crypt. Ured. *f. 69b.*
Add the exsiccati: Barth. N. Am. Ured. *3231.*

384. **Dicaeoma Sommerfeltii.**
Add the illustrations: Fl. Ital. Crypt. Ured. *f. 69a;* Sitz.-Ber. Böhm. Ges. Wiss. **1900**[26]: *f. 52, 53.*

385. **Dicaeoma Polygoni-alpini.**
Add: EXSICCATI: Barth. N. Am. Ured. *3132.*

385. **Dicaeoma Acetosae.**
Add the illustration: Fl. Ital. Crypt. Ured. *f. 70c.*

386. **Dicaeoma punctiforme.**
Add the host: *Rumex altissimus* Wood, Wisconsin.
Add to the distribution: "and one locality in south-central Wisconsin; also in Siberia."
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 32, f. 441.*

386. **Dicaeoma Guillemineae.**
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 32, f. 436.*

387. **Dicaeoma (?) obesisporum.**
Add the synonym: » *Uredo nitidula* Arth. Bull. Torrey Club **47**: 473. 1920.
Add the host: *Achyranthes philoxeroides* (Mart.) Standley (*Alternanthera philoxeroides* Griseb.), Guatemala.

389. **Dicaeoma (?) tardissimum.**
Add the exsiccati: Barth. N. Am. Ured. *2565, 2969.*

389. **Dicaeoma Calthae.**
Add the synonym: *Persooniella Calthae* Sydow, Ann. Myc. **20**: 118. 1922.
Add the illustrations: Fl. Ital. Crypt. Ured. *f. 67f;* Grove, Brit. Rust Fungi *f. 165.*
Add the exsiccati: Brenckle, Fungi Dak. *486.*

390. **Dicaeoma areolatum.**
Add the host: *Caltha rotundifolia* (Huth) Greene, Colorado; omit " Colorado " after *C. leptosepala.*

390. **Dicaeoma calthaecola.**

Add the illustrations: Fl. Ital. Crypt. Ured. *f. 67c;* Grove, Brit. Rust Fungi *f. 166.*

392. **Dicaeoma Nolitangeris.**

Add the exsiccati: Thaxter, Rel. Farl. *263.*

392. **Dicaeoma Violae.**

Insert, among the hosts, as a synonym after *Viola eriocarpa:* (*V. scabriuscula* Schw.).

Add the hosts:

Viola Langsdorfii Fischer, Alaska.
Viola palmata L., Mississippi.

Add the illustration: Grove, Brit. Rust Fungi *f. 149.*

Add the exsiccati: Barth. N. Am. Ured. *2375, 2475, 3176, 3479;* Thaxter, Rel. Farl. *276.*

394. **Dicaeoma Epilobii-tetragoni.**

Add the hosts:

Boisduvalia parviflora A. Heller, Idaho.
Epilobium jucundum A. Gray (*E. paniculatum jucundum* Trel.), Washington.

Add the illustration: Grove, Brit. Rust Fungi *f. 147.*

Under exsiccati, change Barth. N. Am. Ured. "*1589*" to "*1579,*" and add *2843, 3140, 3242, 3342;* also add Vesterg. Micr. Rar. Sel. *964.*

396. **Dicaeoma Proserpinacae.**

Add the synonym: *Persooniella Proserpinacae* Sydow, Ann. Myc. **20**: 118. 1922.

Add the host: *Proserpinaca platycarpa* Small, Florida.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 35, f. 351.*

Add the exsiccati: Barth. N. Am. Ured. *3161.*

396. **Dicaeoma Pimpinellae.**

Add the hosts:

Chaerophyllum Teinturieri Hook., Tennessee.
Osmorrhiza ambigua Coult. & Rose, Oregon.
Osmorrhiza brachypoda Torr., California.

Add the illustration: Grove, Brit. Rust Fungi *f. 136.*

Add the exsiccati: Barth. N. Am. Ured. *2557, 3061, 3262;* Brenckle, Fungi Dak. *493;* Thaxter, Rel. Farl. *268a, b.*

398. **Dicaeoma Cicutae.**

Add the exsiccati: Barth. N. Am. Ured. *3133;* Thaxter, Rel. Farl. *247.*

398. **Dicaeoma marylandicum.**

Add the synonym: *Allodus lacerata* Orton, Mem. N. Y. Bot. Gard. **6**: 194. 1916.

Add the hosts:

Euryptera parvifolia Coult. & Rose, California.
Sanicula nevadensis S. Wats., California.
Sanicula trifoliata Bickn., Pennsylvania.
Sanicula tuberosa Torr., California.

400. **Dicaeoma Ortonii.**

Add the hosts:

Dodecatheon frigidum Cham. & Schlecht., Alaska.
Dodecatheon sp., South Dakota.

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 45, f. 145a, b.*

400. **Dicaeoma Gentianae.**

Add the hosts:

Amarella plebia (Cham.) Greene (*Gentiana plebia* Cham.), Colorado.
Dasystephana interrupta (Greene) Rydb. (*Gentiana interrupta* Greene), Saskatchewan.
Dasystephana Newberryi (A. Gray) Arth. (*Gentiana Newberryi* A. Gray), California.
Dasystephana Sceptrum (Griseb.) Arth. (*Gentiana Sceptrum* Griseb.), Washington.

Add the illustrations: Holway, N. Am. Ured. **1**: *pl. 45, f. 147a, b; pl. 46, f. 147c;* Grove, Brit. Rust Fungi, *f. 128.*

Add the exsiccati: Barth. N. Am. Ured. *2756, 2757, 2845.*

401. **Dicaeoma Convolvuli.**

Add the synonym: *Persooniella Convolvuli* Sydow, Ann. Myc. **20**: 118. 1922.

Add the hosts:

Convolvulus polymorphus Greene, Oregon.
Convolvulus repens L., Tennessee.

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 48, f. 154a, b.*

Add the exsiccati: Barth. N. Am. Ured. *2347, 2431, 2658, 2838, 2839;* Brenckle, Fungi Dak. *461, 564;* Ellis & Ev. N. Am. Fungi *2251.*

402. **Dicaeoma jalapense.**

Add the synonym: *Puccinia jalapense* Barth. N. Am. Ured. *2549.* 1922.

Add the exsiccati: Barth. N. Am. Ured. *2549.*

402. **Dicaeoma Lithospermi.**

Reduce this name to synonymy, and substitute: **Dicaeoma tuyutense** (Speg.) Arthur.

Add further the synonyms: *Puccinia tuyutensis* Speg. Anal. Soc. Ci. Argent. **12**: 70. 1881. *Uredo Evolvuli* Speg. Anal. Soc. Ci. Argent. **12**: 72. 1881. *Uredo tuyutensis* Speg. Anal. Soc. Ci. Argent. **12**: 75. 1881. *Aecidium tuyutense* Speg. Anal. Soc. Ci. Argent. **12**: 79. 1881.

Change the name of the first host from "*nummularis*" to "*nummularius.*"

Change the type locality to read: " Tuyu, Argentina, on *Evolvulus falcatus.*"

Add to the distribution: " and South America."

Insert: ILLUSTRATIONS: Sydow, Monog. Ured. **1**: *pl. 21, f. 301;* Holway, N. Am. Ured. **1**: *pl. 49, f. 157.*

403. **Dicaeoma Cressae.**

Add the synonym: *Caeoma cressatum* Link, in Willd. Sp. Pl. **6**[2]: 49. 1825.

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 49, f. 155a–c.*

Add the exsiccati: Barth. N. Am. Ured. *3239.*

403. **Dicaeoma Giliae.**

Add the host: *Gilia Bigelovii* A. Gray, Arizona.

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 51, f. 165.*

404. **Dicaeoma fumosum.**

Add the synonym: *Persooniella fumosa* Sydow, Ann. Myc. **20**: 118. 1922.

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 53, f. 170.*

404. **Dicaeoma** (?) **Cryptanthes.**

Add the hosts:

Cryptantha ambigua (A. Gray) Greene (*Krynitskia ambigua* A. Gray), California.
Cryptantha microstachys Greene (*Krynitskia microstachys* Greene), California.

Insert: ILLUSTRATIONS: Sydow, Monog. Ured. **1**: *pl. 21, f. 300;* Holway, N. Am. Ured. **1**: *pl. 53, f. 174.*

405. **Dicaeoma Menthae.**

Change the host " *Hedeoma* sp." to " *Hedeoma nana* (Torr.) Greene."

Add the illustration: Fl. Ital. Crypt. Ured. *f. 61a.*

Add the exsiccati: Barth. N. Am. Ured. *2362, 2363, 2364, 2454, 2552, 2665, 2764, 2765, 2952, 3053, 3054, 3055, 3155, 3258, 3259, 3469;* Thaxter, Rel. Farl. *261a, b.*

406. **Dicaeoma Monardellae.**

Add the host: *Madronella oblongifolia* Rydb., Utah.

407. **Dicaeoma fuscatum.**
Add the synonym: *Eriosporangium fuscatum* Sydow, Ann. Myc. **20**: 122. 1922.

408. **Dicaeoma medellinense.**
Add the synonym: *Eriosporangium medellinense* Sydow, Ann. Myc. **20**: 122. 1922.

409. **Dicaeoma insititium.**
Add the synonym: *Eriosporangium insititium* Sydow, Ann. Myc. **20**: 122. 1922.

410. **Dicaeoma Hyptidis-mutabilis.**
Add the synonym: *Eriosporangium Hyptidis-mutabilis* Sydow, Ann. Myc. **20**: 122. 1922.

411. **Dicaeoma salviicola.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 20, f. 278.*

411. **Dicaeoma farinaceum.**
Add the host: *Salvia azurea* Lam., Alabama.
Add the exsiccati: Barth. N. Am. Ured. *3243.*

413. **Dicaeoma mitratum.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 19, f. 279.*

415. **Dicaeoma Anisacanthi.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 14, f. 211.*

415. **Dicaeoma Ruelliae.**
Add the hosts:
Ruellia Drummondii (Nees) A. Gray, Texas.
Ruellia pedunculata Torr., Missouri.
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 15, f. 212.*
Add the exsiccati: Barth. N. Am. Ured. *2863, 2864, 2961, 3069, 3359.*

417. **Dicaeoma punctatum.**
Add the host: *Galium californicum* H. & A., California.
Add the illustration: Fl. Ital. Crypt. Ured. *f. 59a;* Grove, Brit. Rust Fungi *f. 115.*
Add the exsiccati: Barth. N. Am. Ured. *2462;* Thaxter, Rel. Farl. *271.*

418. **Dicaeoma troglodytes.**
Omit " North Dakota."

418. **Dicaeoma eximium.**
Add the synonym: *Persooniella eximia* Sydow, Ann. Myc. **20**: 118. 1922.

419. **Dicaeoma splendens.**
Add the synonym: *Persooniella splendens* Sydow, Ann. Myc. **20**: 118. 1922.
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 7, f. 115.*

419. **Dicaeoma (?) Xanthiifoliae.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 6, f. 87.*
Add the exsiccati: Barth. N. Am. Ured. *2976.*

420. **Dicaeoma Becki.**
Add the synonym: *Eriosporangium Becki* Sydow, Ann. Myc. **20**: 122. 1922.

420. **Dicaeoma erraticum.**
Add the synonym: *Eriosporangium erraticum* Sydow, Ann. Myc. **20**: 122. 1922.

422. **Dicaeoma Baccharidis-hirtellae.**
Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 2, f. 20.*

423. **Dicaeoma evadens.**

Change "1920" in second line of synonymy to "1921."

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 1, f. 15.*

Add the exsiccati: Barth. N. Am. Ured. *2409, 2410, 3142.*

423. **Dicaeoma Baccharidis.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 1, f. 16.*

Add the exsiccati: Barth. N. Am. Ured. *3229, 3230.*

425. **Dicaeoma oaxacanum.**

Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 2, f. 21.*

426. Insert:

244a. **Dicaeoma Plucheae** (Sydow) Arthur & Jackson.

Uredo Plucheae Sydow, Ann. Myc. **1**: 333. 1903.
Uredo biocellata Arth. Bull. Torrey Club **33**: 517. 1906.
Puccinia biocellata Vesterg. Micr. Rar. Sel. *1267.* 1908.
Uredo Plucheae Speg. Anal. Mus. Nac. Buenos Aires **19**: 319. 1909.
Puccinia Plucheae Arth. Bull. Torrey Club **49**: 194. 1922.

O. Pycnia not seen.

I. Aecia hypophyllous, in small groups on purplish spots 5–10 mm. across, small, 0.2–0.3 mm. in diameter; peridium fragile, scarcely extending above surface of leaf; peridial cells rhomboidal, 14–16 by 24–27 μ, the outer wall 3 μ thick, transversely striate, smooth, the inner wall 1.5 μ thick, verrucose; aeciospores angularly globoid, 13–17 μ in diameter; wall colorless, thin, 1 μ, minutely and inconspicuously verrucose.

II. Uredinia amphigenous, scattered, round, large, 0.7–1.5 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis noticeable; urediniospores broadly ellipsoid or obovoid, 23–27 by 27–32 μ; wall light chestnut-brown, 1.5–2 μ thick, depressed about each pore, the separated cuticle inflated and forming circular bullate areas 18–25 μ in diameter, closely and coarsely echinulate, the pores 2, equatorial.

III. Telia hypophyllous, scattered, round, 0.2–0.5 mm. in diameter, early naked, dark cinnamon-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid or oblong, 19–23 by 40–50 μ, rounded or obtuse above and below, slightly constricted at septum; wall light cinnamon-brown, 1–1.5 μ thick, much thicker above, forming an abrupt, sub-hyaline umbo, 7–9 μ, smooth; pedicel colorless, fragile, equaling spore or shorter.

ON CARDUACEAE:
Pluchea camphorata (L.) DC., Florida.
Pluchea odorata (L.) Cass., Guatemala; Porto Rico.
Pluchea purpurascens (Sw.) DC., Florida; Santo Domingo; Mona Island; Porto Rico.
TYPE LOCALITY: Eustis, Lake County, Florida, on *Pluchea camphorata.*
DISTRIBUTION: Central Florida southward through the West Indies and in Central America; also in South America.

427. **Dicaeoma Helianthi-mollis.**

Add the hosts:
Helianthus australis Small, Georgia.
Helianthus cucumerifolius T. & G., Texas.

Add the illustration: Fl. Ital. Crypt. Ured. *f. 55.*

Add the exsiccati: Barth. N. Am. Ured. *2354, 2355, 2356, 2357, 2358, 2359, 2444, 2445, 2446, 2547, 2548, 2660, 2761, 2762, 2849, 2850, 2943, 2944, 3047, 3048, 3049, 3050, 3146, 3147, 3148, 3149, 3248, 3249, 3352;* Thaxter, Rel. Farl. *257.*

430. **Dicaeoma Zexmeniae.**

Add the hosts:

Zexmenia frutescens (Mill.) Blake, Salvador.
Zexmenia hispida (H.B.K.) A. Gray, Salvador.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 11, f. 165.*

431. **Dicaeoma inauditum.**
Add the synonym: *Eriosporangium inauditum* Sydow, Ann. Myc. **20**: 122. 1922.
Add the host: *Zexmenia scandens* Hemsl., Honduras.

432. **Dicaeoma Verbesinae.**
Add the exsiccati: Barth. N. Am. Ured. *2273, 2373, 2870, 3175.*

432. **Dicaeoma irregulare.**
Add: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 10, f. 148.*

432. **Dicaeoma cognatum.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 10, f. 149.*
Add the exsiccati: Barth. N. Am. Ured. *2750.*

433. **Dicaeoma abruptum.**
Add the hosts:

Viguiera annua (M. E. Jones) Blake, Arizona.
Viguiera dentata (Cav.) Spreng., Texas.
Zexmenia podocephala A. Gray, Arizona.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 10, f. 151, 158.*

434. **Dicaeoma senecionicola.**
Add the host: *Senecio Petasites* DC., Salvador.

435. **Dicaeoma Cnici.**
Add the exsiccati: Barth. N. Am. Ured. *2434.*

435. **Dicaeoma Lapsanae.**
Add the illustration: Grove, Brit. Rust Fungi *f. 99.*

436. **Dicaeoma** (?) **Harknessii.**
Add the synonym: *Dicaeoma Nemoseridis* Fairman, Field Mus. Nat. Hist. Bot. Ser. **5**: 334. 1923.
Add the hosts:

Malacothrix arachnoidea McGregor, California.
Malacothrix saxatilis (Nutt.) T. & G., California.

Add the exsiccati: Barth. N. Am. Ured. *2443.*

437. **Dicaeoma** (?) **Stephanomeriae.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 9, f. 135.*

437. **Dicaeoma variabile.**
Add the illustration: Grove, Brit. Rust Fungi *f. 105.*

437. **Dicaeoma Orbicula.**
Add the exsiccati: Barth. N. Am. Ured. *3058;* Thaxter, Rel. Farl. *266a–d.*

438. **Dicaeoma hemisphaericum.**
Add the synonym: *Aecidium minussense* Thüm. Bull. Soc. Nat. Mosc. **53**: 213. 1878.
Add the exsiccati: Barth. N. Am. Ured. *2945, 3353.*

440. **PUCCINIOLA.**
Add the synonyms: *Groveola* Sydow, Ann. Myc. **19**: 173. 1921. *Poliotelium* Sydow, Ann. Myc. **20**: 124. 1922.

441. In the key.
Insert after line 4:

Host belonging to family Loranthaceae. *4a. P. Urbaniana.*

441. **Pucciniola Brodiaeae.**

Omit, among the hosts, after *Triteleia grandiflora:* "Idaho, Utah, Washington," represented by aecia, which are transferred to *Dicaeoma Pattersonianum* (page 330); and add *Hesperoscordum lacteum* Lindl. (*Brodiaea lactea* S. Wats.), Washington.

Change the distribution to read: "Central California to Washington, in the coastal area."

441. **Pucciniola primaverilis.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 11, f. 141.*

442. **Pucciniola Miurae.**

Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 9, f. 3.*

443. Insert:

4a. **Pucciniola Urbaniana** (P. Henn.) Arthur.

Uromyces Urbanianus P. Henn. Hedwigia **36**: 213. 1897.

O. Pycnia not seen.

I. Aecia chiefly hypophyllous, closely aggregate on more or less hypertrophied areas 6–12 mm. in diameter; peridium white, cylindric, 0.2–0.3 mm. in diameter, erect or somewhat recurved, coarsely and irregularly lacerate, fragile; peridial cells in face view hexagonally or irregularly oblong, 20–27 by 35–55 μ, slightly overlapping, strongly rugose, in side view linear or lanceolate, the outer wall thin, 1–2 μ, smooth, the inner wall thicker, 2–3 μ, prominently roughened; aeciospores globoid or ellipsoid, 22–26 by 28–34 μ; wall colorless, 1.5–2.5 μ, much thicker above, 5–12 μ, closely and noticeably verrucose.

III. Telia amphigenous, solitary or in small circinating groups 1.5–3 mm. in diameter, oblong to fusiform, 0.5–1.5 mm. long, early dehiscent by a longitudinal slit, somewhat pulverulent, chestnut-brown, ruptured epidermis erect and prominent; teliospores elongate-oblong or fusiform-oblong, 15–20 by 32–47 μ, rounded or less often narrowed at each end; wall light chestnut-brown, 1.5–2.5 μ thick, somewhat thicker at apex, 4–7 μ, evenly and noticeably verrucose, sometimes appearing striate; pedicel nearly or quite colorless, slender, short, fragile.

ON LORANTHACEAE:
Phthirusa pyrifolia (H.B.K.) Eichl. (*Loranthus pyrifolia* H.B.K.), Salvador.
TYPE LOCALITY: St. Anna, Trinidad, on *Oxycanthus spicatus.*
DISTRIBUTION: Salvador; also in South America.

443. **Pucciniola Rickeriana.**

Transferred to *Nigredo Rickeriana* (page 757).

443. **Pucciniola Atriplicis.**

Add the hosts:

Atriplex californica Moq., California.
Atriplex polycarpa S. Wats., Arizona.

Add the exsiccati: Barth. N. Am. Ured. *2597.*

444. **Pucciniola Iresines.**

Add the synonym: *Poliotelium Iresines* Sydow, Ann. Myc. **20**: 124. 1922.

444. **Pucciniola Spragueae.**

Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 8, f. 111.*

445. **Pucciniola Jonesii.**

Add the exsiccati: Barth. N. Am. Ured. *3092.*

446. **Pucciniola montana.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 4, f. 74.*

447. **Pucciniola Argophyllae.**
Add the exsiccati: Barth. N. Am. Ured. *2688, 2879, 2880, 2983, 3088;* and change Barth. Fungi Columb. "*2094*" to "*2904.*"

447. **Pucciniola oblonga.**
Add the host: *Trifolium olivaceum* Greene, California.
Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 3.*

448. **Pucciniola nerviphila.**
Add to the distribution: "also in Europe and South America."
Add: ILLUSTRATIONS: Centralb. Bak. II. Abt. **52**: 227. *f. 3;* Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 8, f. 2.* EXSICCATI: Clements, Crypt. Form. Colo. *541.*

449. **Pucciniola carnea.**
Add the synonyms: *Aecidium Phacae-frigidae* Wahlenb. Fl. Lapp. 525. 1812. *Caeoma appendiculatum* Sommerf. Suppl. Fl. Lapp. 232. 1826. *Uromyces Phacae-frigidae* Hariot, Jour. de Bot. **7**: 376. 1893.
Add the host: *Phaca frigida* L. (*Astragalus frigidus* A. Gray), Northwest Territory (115° west, 69° north).
Add the illustration: Sydow, Monog. Ured. **2**: *pl. 3, f. 53.*

450. **Pucciniola Hedysari-obscuri.**
Add the hosts:
Hedysarum boreale Nutt., Manitoba.
Hedysarum occidentale Greene, Washington.
Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 7, f. 8.*
Add the exsiccati: Barth. N. Am. Ured. *2989, 3182, 3183.*

450. **Pucciniola porosa.**
Add the exsiccati: Barth. N. Am. Ured. *2795, 3089, 3392.*

451. **Pucciniola coordinata.**
Add the host: *Tithymalus robustus* (Engelm.) Small (*Euphorbia robusta* Engelm.), Utah.
Add: EXSICCATI: Barth. N. Am. Ured. *2485;* Garrett, Fungi Utah. *96.*

451. **Pucciniola venusta.**
Add: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 2, f. 26.*

452. **Pucciniola maculans.**
Add the host: *Cestrum macrophyllum* Vent., Costa Rica.

452. **Pucciniola Cestri.**
Add the host: *Cestrum diurnum* L., Cuba.

453. **Pucciniola Tweediana.**
Add the synonym: *Groveola indurata* Sydow, Ann. Myc. **19**: 173. 1921.
Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 2, f. 23.*

453. **ALLODUS.**

Add the synonyms: *Linkiella* Sydow, Ann. Myc. **19**: 173. 1921. *Poliomella* Sydow, Ann. Myc. **20**: 122. 1922.

453. In the key.

Replace line 2 by:

Host belonging to family Poaceae.	
Species autoecious.	1. *A. graminella.*
Species heteroecious.	1*a*. *A. interveniens.*

454. **Allodus graminella.**

Add the synonyms: *Aecidium graminellum* Speg. Hongos Sud-am. *29*, hyponym. 1881. *Puccinia graminella chilensis* Neger, Anal. Univ. Chile **93**: 783. 1896.

455. Insert:

1a. **Allodus interveniens** (Peck) Arthur & Orton.

? *Aecidium Modiolae* Thüm. Flora **63**: 31. 1880.
Roestelia interveniens Peck, Bull. Torrey Club **10**: 74. 1883.
Aecidium roestelioides Ellis & Ev. Jour. Myc. **1**: 93. 1885.
Aecidium Modiolae Sphaeralceae P. Henn. Hedwigia **34**: 322, hyponym. 1895.
Aecidium Malvastri P. Henn. Hedwigia **36**: 216. 1897.
Aecidium malvastricola P. Henn.; Sacc. & Sydow, in Sacc. Syll. Fung. **14**: 371. 1899.
Aecidium interveniens Farl. Bibl. Index **1**: 58. 1905.
Aecidium Sphaeralceae Speg. Anal. Mus. Nac. Buenos Aires **19**: 322. 1909. Not *A. Sphaeralceae* Ellis & Ev. 1895.
Aecidium sphaeralceanum Sacc. & Trott. in Sacc. Syll. Fung. **21**: 756. 1912.
Puccinia interveniens Bethel; Blasdale, Univ. Calif. Publ. Bot. **7**: 119. 1919.
Dicaeoma interveniens Arth. & Fromme, N. Am. Flora **7**: 299. 1920.

O and I. Pycnia, aecia, and hosts under Malvaceae, as given on page 300.

III. Telia epiphyllous, scattered, early naked, very large and prominent, oblong-linear or fusiform, 5–20 mm. long, or longer, by 1–2 mm. broad, dark chestnut-brown, the epidermis rupturing in shreds full length of the sorus; teliospores oblong or fusiform-oblong, less often ellipsoid, 23–29 by 35–58 μ, obtuse or rounded at both ends, not constricted at septum; wall light golden- or chestnut-brown, in some spores darker, 3 μ thick, much thicker above, 6–10 μ, smooth; pedicel colorless, once to thrice length of spore.

On Poaceae:
Stipa comata Trin. & Rupr. (*S. Tweedyi* Scribn.), Colorado.
Stipa lepida Hitchc., California.
Stipa lepida Andersoni (Vasey) Hitchc. (*S. eminens Andersoni* Vasey), California.
Stipa Lettermani Vasey, Colorado.
Stipa minor (Vasey) Scribn., Colorado, Utah.
Stipa pulchra Hitchc., California.
Stipa speciosa Trin. & Rupr., Arizona, California.
Type locality: Lower California, on *Malvastrum Thurberi*.
Distribution: Western Nebraska to southern Idaho and northwestern Mexico; also in South America.
Exsiccati: Barth. Fungi Columb. *2404, 3201;* Barth. N. Am. Ured. *206, 1937, 2102 2450, 2604, 2605, 2606;* Clements, Crypt. Form. Colo. *600;* Garrett, Fungi Utah. *193.*

455. **Allodus Calochorti.**

Add the host: *Calochortus eurocarpus* S. Wats., Idaho.
Add the exsiccati: Barth. N. Am. Ured. *3201.*

456. **Allodus Dichelostemmae.**

Add the host: *Hookera Douglasii* (S. Wats.) Piper, Washington.
Add the illustration: Sydow, Monog. Ured. **1**: *pl. 35, f. 474.*

457. **Allodus claytoniata.**

Add the host: *Claytonia megarrhiza* (A. Gray) Parry, Colorado.

457. **Allodus gigantispora.**

Add the synonym: *Linkiella gigantispora* Sydow, Ann. Myc. **19**: 173. 1921.

458. **Allodus opposita.**

Insert the synonyms: *Puccinia opposita* Arth. Bull. Torrey Club **48**: 33. 1921. *Linkiella opposita* Sydow, Ann. Myc. **19**: 173. 1921.

Add the exsiccati: Barth. N. Am. Ured. *3303.*

458. **Allodus Podophylli.**

Add the exsiccati: Sydow, Monog. Ured. *2579.*

459. **Allodus arabicola.**

Add the synonym: *Dicaeoma arabicola* Kuntze, Rev. Gen. **3**[3]: 467. 1898.

Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 52, f. 168c.*

459. **Allodus consimilis.**

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 30, f. 417.*

460. **Allodus effusa.**

Add the host: *Viola purpurea* Kellogg, California.

Add the exsiccati: Vesterg. Micr. Rar. Sel. *1277.*

461. **Allodus Jussiaeae.**

Add the synonym: *Lindrothia Jussiaeae* Sydow, Ann. Myc. **20**: 119. 1922.

462. **Allodus microica.**

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 25, f. 347.*

462. **Allodus Erigeniae.**

Insert the synonym: *Puccinia Erigeniae* Arth. Bull. Torrey Club **48**: 33. 1921.

Add the exsiccati: Barth. N. Am. Ured. *2902.*

463. **Allodus Jonesii.**

Omit, among the hosts, " South Dakota " after *Musineon divaricatum.*

Add the hosts:

Aulospermum longipes (S. Wats.) Coult. & Rose (*Cymopterus longipes* S. Wats.), Utah.
Cogswellia ambigua (Nutt.) M. E. Jones (*Peucedanum ambiguum* Nutt.), Wyoming.
Cogswellia Gormani (Howell) M. E. Jones (*Peucedanum Gormani* Howell, *Lomatium Gormani* Coult. & Rose), Washington.
Drudeophytum Parishii Coult. & Rose, California.
Euryptera parvifolia (Hook. & Arn.) Coult. & Rose, California.
Pseudopteryxia anisata (A. Gray) Rydb. (*Cymopterus anisatus* A. Gray, *Pseudocymopterus anisatus* Coult. & Rose), Utah.
Pteryxia foeniculacea Nutt. (*Cymopterus foeniculaceus* T. & G.), Wyoming.

Add the illustration: Sydow, Monog. Ured. **1**: *pl. 24, f. 337.*

Add the exsiccati: Barth. N. Am. Ured. *2607, 3203, 3205.*

464. **Allodus melanconioides.**

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 45, f. 144.*

465. **Allodus Swertiae.**

Add the synonym: *Aecidium Fraseri* Trel. Harriman Alaska Exp. Crypt. 36. 1904.

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 46, f. 149.*

466. **Allodus crassipes.**

Add the synonym: *Puccinia Ipomoeae-panduratae* Sydow, Monog. Ured. **1**: 323. 1902.

Add the hosts:

Ipomoea microsticta Hallier, Salvador.
Ipomoea parasitica G. Don, Salvador.

Insert: ILLUSTRATIONS: Mém. Soc. Neuch. Sci. Nat. **5**: 488. *f. 22;* Sydow, Monog. Ured. **1**: *pl. 22, f. 312;* Holway, N. Am. Ured. **1**: *pl. 49, f. 158.*
Add the exsiccati: Barth. N. Am. Ured. *2701.*

466. **Allodus megalospora.**
Add the synonym: *Puccinia megalospora* Sacc. & Trott.; Sacc. Syll. Fung. **23**: 713. 1925.
Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 50, f. 160.*

467. **Allodus insignis.**
Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 50, f. 163.*

467. **Allodus nocticolor.**
Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 50, f. 159.*
Add the exsiccati: Sydow, Monog. Ured. *2623.*

467. **Allodus superflua.**
Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 50, f. 162.*

468. **Allodus rubicunda.**
Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 50, f. 161.*

468. **Allodus Giliae.**
Insert: ILLUSTRATIONS: Sydow, Monog. Ured. **1**: *pl. 21, f. 304;* Holway, N. Am. Ured. **1**: *pl. 50, f. 164; pl. 51, f. 167a, b; pl. 52, f. 167c, 168a, b, d.*
Add the exsiccati: Barth. N. Am. Ured. *2602, 2603, 2903, 2904.*

469. **Allodus Douglasii.**
Add the synonym: *Lindrothia Douglasii* Sydow, Ann. Myc. **20**: 119. 1922.
Add the host: *Leptodactylon pungens* (Torr.) Nutt. (*Gilia pungens* Benth.), California.
Insert: ILLUSTRATIONS: Sydow, Monog. Ured. **1**: *pl. 21, f. 306, 307;* Holway, N. Am. Ured. **1**: *pl. 51, f. 166 a–c.*
Add the exsiccati: Barth. N. Am. Ured. *2601.*

470. **Allodus yosemitana.**
Add the synonym: *Lindrothia yosemitana* Sydow, Ann. Myc. **20**: 119. 1922.
Add the host: *Leptodactylon pungens* (Torr.) Nutt. (*Gilia pungens* Benth.), Colorado.
Add: EXSICCATI: Barth. N. Am. Ured. *2608.*

470. **Allodus mellifera.**
Change the generic name of the hosts from "*Audibertella*" to "*Audibertiella*" and add:

Audibertiella humilis (Benth.) Briq. (*Audibertia humilis* Benth., *Salvia sonomensis* Greene), California.
Audibertiella nivea (Benth.) Briq. (*Audibertia nivea* Benth., *Ramona nivea* Briq.), California.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 19, f. 274.*
Add the exsiccati: Barth N. Am. Ured. *2403, 3003, 3206, 3301, 3302.*

471. **Allodus Chamaesarachae.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 17, f. 247.*
Add the exsiccati: Barth. N. Am. Ured. *2401.*

472. **Allodus complicata.**
Add the hosts:

Penstemon antirrhinoides Benth., Arizona.
Penstemon venustus Dougl., Washington.

Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 16, f. 238.*
Add the exsiccati: Barth. N. Am. Ured. *3059, 3060.*

472. **Allodus rufescens.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 16, f. 235.*

473. **Allodus scaberistipes.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 45, f. 575.*

473. **Allodus ambigua.**
Insert: ILLUSTRATION: Grove, Brit. Rust Fungi *f. 118.*
Add the exsiccati: Barth. N. Am. Ured. *2901.*

473. **Allodus commutata.**
Omit the hosts: *Valeriana acutiloba, V. edulis, Valerianella congesta.*

474. **Allodus intermixta.**
Add the exsiccati: Barth. N. Am. Ured. *2402, 2702, 2905, 3202.*

474. **Allodus tenuis.**
Add the synonym: *Linkiella tenuis* Sydow, Ann. Myc. **19**: 173. 1921.
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 5, f. 69.*
Add the exsiccati: Barth. N. Am. Ured. *3402;* Thaxter, Rel. Farl. *273a, b.*

475. **Allodus Batesiana.**
Add the synonym: *Linkiella Batesiana* Sydow, Ann. Myc. **19**: 173. 1921.

475. **Allodus gnaphaliata.**
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 5, f. 77.*
Add the exsiccati: Barth. N. Am. Ured. *3001, 3002;* Thaxter, Rel. Farl. *258.*

476. **Allodus Desmanthodii.**
Add the synonym: *Lindrothia Desmanthodii* Sydow, Ann. Myc. **19**: 173. 1921.
Insert: ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 4, f. 58.*

476. **Allodus Ancizari.**
Add the synonym: *Poliomella Ancizari* Sydow, Ann. Myc. **20**: 122. 1922.

477. **Allodus subcircinata.**
Add the exsiccati: Brenckle, Fungi Dak. *503.*

477. **KLEBAHNIA.**
Insert the synonym: *Argomycetella* Sydow, Ann. Myc. **20**: 124. 1922.

478. **Klebahnia Glycyrrhizae.**
Add the exsiccati: Barth. N. Am. Ured. *2488, 2882, 2988.*

479. **Klebahnia hyalina.**
Add the exsiccati: Barth. N. Am. Ured. *3386.*

480. **Klebahnia dolichospora.**
Add the synonym: *Argomycetella dolichospora* Sydow, Ann. Myc. **20**: 124. 1922.
Add the host: *Tournefortia peruviana* Poir., Costa Rica.
Insert: ILLUSTRATION: Sydow, Monog. Ured. **2**: *pl. 2, f. 29.*

480. **Klebahnia pressa.**
Add the synonym: *Argomycetella pressa* Sydow, Ann. Myc. **20**: 124. 1922.

481. **Klebahnia Bidentis.**
Add the host: *Bidens cynapiifolia* H.B.K., Porto Rico.
Add the exsiccati: Barth. N. Am. Ured. *3487.*

489. **Bullaria Hydrocotyles.**
Omit, among the hosts, Porto Rico after *Hydrocotyle australis.*
Add the exsiccati: Barth. N. Am. Ured. *3153, 3487.*

491. **Bullaria Cynomarathri.**
Add the host: *Sphenosciadium capitellatum* (Benth. & Hook.) A. Gray (*Selinum capitellatum* Benth. & Hook.), California.

492. **Bullaria Vincae.**
Add to the type locality: "on *Vinca major.*"

492. **Bullaria Cordiae.**
Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 53, f. 173.*

493. **Bullaria impedita.**
Add the hosts:
Salvia rubiginosa Benth., Salvador.
Salvia occidentalis Sw., Santo Domingo.

495. **Bullaria tumidipes.**
Add the exsiccati: Barth. N. Am. Ured. *3075.*

496. **Bullaria insulana.**
Add the host: *Vernonia racemosa* Delponte, Santo Domingo.

496. **Bullaria Arthuriana.**
In the citation for *Puccinia Arthuriana*, read "295," not "395."

497. **Bullaria fuscella.**
Add the host: *Vernonia Sprengeliana* Schultz-Bip., Santo Domingo.

497. **Bullaria Vernoniae.**
Add the exsiccati: Barth. N. Am. Ured. *2571, 2685, 2780, 3273.*

500. **Bullaria (?) Conoclinii.**
Add the exsiccati: Barth. N. Am. Ured. *2837, 3038, 3238.*

503. **Bullaria Kuhniae.**
Add the host: *Kuhnia reticulata* A. Nelson, Montana.
Add the exsiccati: Barth. N. Am. Ured. *2950, 3254.*

506. **Bullaria Balsamorhizae.**
Add the exsiccati: Barth. N. Am. Ured. *2933, 3131.*

507. **Bullaria Enceliae.**
Add the host: *Simsia grandiflora* (Hemsl.) Benth. (*Encelia grandiflora* Hemsl.), Salvador; Panama.

508. **Bullaria Absinthii.**
Add the host: *Artemisia pabularis* (A. Nelson) Rydb., South Dakota.
Add the exsiccati: Barth. N. Am. Ured. *2529, 2643, 2734, 2823, 2824, 2925, 3026, 3221;* Brenckle, Fungi Dak. *561.*

509. **Bullaria Cirsii.**
Add the host: *Cirsium muticum* Michx. (*Carduus muticus* Pers.), Connecticut.
Add the exsiccati: Barth. N. Am. Ured. *2833, 3037, 3134, 3235, 3339.*

512. **Bullaria Bardanae.**
Add the exsiccati: Barth. N. Am. Ured. *2650, 2740, 2830, 2831, 3337;* Brenckle, Fungi Dak. *517.*

513. **Bullaria Hieracii.**
In the citation for *Puccinia Hieracii*, for "226. 1812" read "ed. 2. 226. 1817."
Add the hosts:
Leontodon lyratus Ledeb. (*Taraxacum alaskanum* Rydb.), Alaska.
Hieracium scabriusculum Schw., Manitoba.
Add the exsiccati: Barth. N. Am. Ured. *2564, 2663, 2852, 2853, 2947, 2948, 3139, 3151, 3152, 3252, 3253.*

516. **Teleutospora heteroderma.**
Add the host: *Erythronium giganteum* Lindl., Washington.

517. **Teleutospora abbreviata.**
Add the exsiccati: Barth. N. Am. Ured. *3377*.

517. **Teleutospora Tranzschelii.**
Add the exsiccati: Barth. N. Am. Ured. *3197*, *3399*.

519. **Teleutospora Rudbeckiae.**
Add the illustration: Jour. Coll. Agr. Hokkaido Univ. **11**: *pl. 7, f. 3*.

520. **MICROPUCCINIA.**
Insert after the last synonym: Not *Trailia* Sutherland, 1914.

521. In the key.
Replace line 9 by:

Teliospore-wall noticeably verrucose.	
Verrucose markings scattered.	17. *M. Ranunculi.*
Verrucose markings dense.	17*a*. *M. retecta.*

522. In the key.
For "96. *M. solanitum*" read "96. *M. Solani*."

523. In the key.
Replace line 15 by:

Host belonging to family Campanulaceae.	
Teliospores oblong, with obtuse apex.	118. *M. Campanulae.*
Teliospores ellipsoid, with rounded apex.	118*a*. *M. Nova-Zembliae.*

525. **Micropuccinia ornata.**
Add to the distribution: also in eastern Russia.

526. **Micropuccinia Arenariae.**
In the synonymy, for "*Puccinia Lychnites*" read "*Uredo Lychnitis*."
Add the host: *Alsine borealis* (Bigel.) Britton (*Stellaria borealis* Bigel.), Washington.

529. **Micropuccinia gemella.**
Add the exsiccati: Barth. N. Am. Ured. *3458*.

530. Insert:

17a. **Micropuccinia retecta** (Sydow) Arthur and Jackson.

Puccinia retecta Sydow, Ann. Myc. **1**: 34. 1903.
Polythelis retecta Arth. Résult. Sci. Congr. Bot. Vienne 341. 1906.

Description and other data as given on page 152, under *Polythelis retecta*, with Alaska added after the host.
Add the host: *Anemone lithophila* Rydb., Wyoming.

531. **Micropuccinia Brandegei.**
Add the host: *Capnoides Scouleri* (Hook.) Kuntze (*Corydalis Scouleri* Hook.), Washington.

531. **Micropuccinia Drabae.**
Add the host: *Draba aurea* Vahl, Alaska.

532. **Micropuccinia Holboellii.**
Add the hosts:
Arabis oreophylla Rydb., Wyoming.
Arabis pendulocarpa A. Nelson, Wyoming.
Omit "Ellis, N. Am. Fungi," and transfer "*1834*" to Ellis & Ev. N. Am. Fungi.

535. **Micropuccinia Heucherae.**
Add the hosts:
Heuchera Richardsonii R. Br., Manitoba.
Mitella caulescens Nutt., Washington.
Add the exsiccati: Barth. N. Am. Ured. *3465*.

536. **Micropuccinia curtipes.**
Add the hosts:

Micranthes integrifolia (Hook.) Small (*Saxifraga integrifolia* Hook.), British Columbia.
Micranthes oregana (Howell) Small (*Saxifraga oregana* Howell), Washington.
Micranthes rhomboidea (Greene) Small (*Saxifraga rhomboidea* Greene), Wyoming.

539. **Micropuccinia Parkerae.**
Add the host: *Grossularia divaricata* (Dougl.) Cov. & Britt. (*Ribes divaricatum* Dougl.), British Columbia.

540. **Micropuccinia Waldsteiniae.**
Add the exsiccati: Barth. N. Am. Ured. *3275*.

540. **Micropuccinia Leveillei.**
Add the host: *Geranium erianthum* DC., Alaska; and change "*Geranium* sp." to "*Geranium Fremontii* T. & G."

540. **Micropuccinia Pyrolae.**
Add the exsiccati: Barth. N. Am. Ured. *3065*.

541. **Micropuccinia Arechavaletae.**
Add the hosts:

Serjania caracasana (Jacq.) Willd., Guatemala.
Serjania trifoliolata Radlk., Salvador.

542. **Micropuccinia Malvacearum.**
Add the synonym: *Puccinia Sidae-rhombifoliae* Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 484. 1913.
Add the illustration: Mém. Soc. Neuch. Sci. Nat. **5**: 485. *f. 20*.
Add the exsiccati: Barth. N. Am. Ured. *2951*, *3052*.

543. **Micropuccinia Sherardiana.**
Interchange the words "autoecious" and "heteroecious" in the note following the diagnosis.
Add the exsiccati: Barth. N. Am. Ured. *3364*, *3477*.

544. **Micropuccinia heterospora.**
Add the synonym: *Uredo Anodae* Lév. Ann. Sci. Nat. III. **3**: 70. 1845.
Add the hosts:

Abutilon Calderoni Standl., Salvador.
Abutilon umbellatum (L.) Sweet, Porto Rico.
Althea rosea Cav., Kansas.
Anoda cristata (L.) Schlecht., Salvador.
Bastardia viscosa (L.) H.B.K. (*Sida foetida* Cav.), Santo Domingo.
Malvaviscus palmanus Pitt. & Donn. Sm., Costa Rica.
Sida angustifolia Lam., Salvador.

Add the exsiccati: Barth. N. Am. Ured. *2851*.

546. **Micropuccinia Anodae.**
Add the host: *Anoda cristata* (L.) Schlecht., Costa Rica.

547. **Micropuccinia hiascens.**
Change the volume-citation for *Puccinia hiascens* from **46** to **47**.

548. **Micropuccinia Circaeae.**
Add the exsiccati: Barth. N. Am. Ured. *3454*.

549. **Micropuccinia Fuchsiae.**
Add the host: *Fuchsia parviflora* Zucc., Salvador.

552. **Micropuccinia Ligustici.**
In the paragraph following the description, for "*Bistortae* (DC.) Kuntze" read "*Polygoni-vivipari* (H. Dietr.) Arth."

Add the host: *Cogswellia Geyeri* (S. Wats.) M. E. Jones (*Peucedanum Geyeri* S. Wats.), Idaho.

Add the exsiccati: Barth. N. Am. Ured. *3204*.

553. **Micropuccinia porphyrogenita.**

Add the exsiccati: Barth. N. Am. Ured. *2959*.

553. **Micropuccinia Dayi.**

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 45, f. 146.*

Add the exsiccati: Rab.-Wint. Fungi Eur. *3206*.

554. **Micropuccinia Haleniae.**

Add to the distribution: also in Manchuria.

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 46, f. 148.*

554. **Micropuccinia concrescens.**

In the synonymy, for "*P. compata* Berk." read "*P. compacta* Berk."

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 46, f. 150.*

555. **Micropuccinia obliqua.**

Add the synonyms: *Puccinia subcollapsa* Ellis, Jour. Myc. **7**: 275. 1893. *Dicaeoma subcollapsum* Kuntze, Rev. Gen. **3**[3]: 470. 1898. *Puccinia Oxypetali* P. Henn. Hedwigia Beibl. **38**: 129. 1899.

Add the hosts:

Macroscepis congestiflora Donn. Sm., Salvador.
Vincetoxicum suberosum (L.) Britton (*Gonolobus suberosus* R. Br.), South Carolina.

Add the illustrations: Holway, N. Am. Ured. **1**: *pl. 46, f. 151a, b; pl. 47, f. 151c, d, f. 152a–d; pl. 48, f. 152e, f.*

556. **Micropuccinia Dichondrae.**

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 49, f. 156.*

556. **Micropuccinia Polemonii.**

Add to the distribution: also Norway and Finland.

Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 52, f. 169.*

557. **Micropuccinia Hydrophylli.**

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 53, f. 171.*

Add the exsiccati: Vesterg. Micr. Rar. Sel. *968*.

557. **Micropuccinia Phaceliae.**

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 53, f. 172.*

558. **Micropuccinia Heliotropii.**

Add: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 53, f. 175.*

558. **Micropuccinia Mertensiae.**

Add the hosts:

Lappula floribunda (Lehm.) Greene, Utah.
Mertensia coronata A. Nelson, Wyoming.

Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 54, f. 176.*

Add the exsiccati: Vesterg. Micr. Rar. Sel. *970*.

558. **Micropuccinia Urbaniana.**

Add the host: *Cornutia pyramidata* L., Salvador; Santo Domingo.

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 54, f. 181.*

559. **Micropuccinia Lantanae.**

Add the illustration: Holway, N. Am. Ured. **1**: *pl. 54, f. 178.*

562. **Micropuccinia Physalidis.**

Add the exsiccati: Barth. N. Am. Ured. *3261*.

562. **Micropuccinia solanita.**

Reduce this name to synonymy, and substitute: **Micropuccinia Solani** (Schw.) Arthur & Jackson.

Insert the synonyms: *Puccinia Solani* Schw.; Berk. & Curt. Jour. Acad. Phila. II. **2**: 281. 1853. *Puccinia Solani-tristis* P. Henn. Hedwigia **35**: 236. 1896. *Puccinia solanicola* Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 505. 1913.

Add to the description this paragraph:

The species is correlated with the heteroecious species, *Dicaeoma tubulosum* (Pat. & Gaill.) Arth., the telia being morphologically similar, and the hosts agreeing with the aecial hosts of the heteroecious species.

Add the host: *Solanum diversifolium* Schlecht., Panama.

Add the illustration: Mém. Soc. Neuch. Sci. Nat. **5**: 506. *f. 34.*

563 **Micropuccinia Sarachae.**

Add the host: *Saracha antillana* Krug. & Urban, Jamaica.

563. **Micropuccinia acrophila.**

Add the hosts:

Besseya alpina (A. Gray) Rydb. (*Synthyris alpina* A. Gray), Wyoming.
Syntheris dissecta Rydb., Wyoming.

565. **Micropuccinia Seymeriae.**

Change the second word in the first line of hosts to read "*Besseyana.*"

568. **Micropuccinia rubefaciens.**

Add the host: *Galium Bloomeri* A. Gray, California.

Add the exsiccati: Barth. N. Am. Ured. *3068*, *3163.*

568. **Micropuccinia lateritia.**

Omit the host: *Diodia littoralis*, and add *Borreria tenella* (H.B.K.) Cham. & Schlecht., Salvador.

Add the exsiccati: Barth. N. Am. Ured. *3154*, *3255*, *3468.*

571. **Micropuccinia Campanulae.**

Omit the host: *Campanula uniflora.*

571. Insert:

118a. **Micropuccinia Nova-Zembliae** (Jørstad) Arthur.

Puccinia Nova-Zembliae Jørstad, Rep. Sci. Res. Norw. Exped. Nov. Zemlya 18: 6. 1923.

O. Pycnia unknown.

III. Telia amphigenous, petiolicolous, or caulicolous, scattered or somewhat confluent, round, 0.4–0.8 mm. in diameter, tardily naked, moderately pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 14–22 by 25–33 μ, rounded above, rounded or somewhat narrowed below, slightly or not constricted at septum; wall chestnut-brown, moderately thin, 1.5–2.5 μ, thicker above, 4–7 μ, with a broad umbo, smooth; pedicel colorless, delicate, short, usually deciduous.

On Campanulaceae:
Campanula uniflora L., Greenland.
Type locality: Belushii Bay, Nova Zembla, on *Campanula uniflora.*
Distribution: Greenland; also in northern Europe.

571. **Micropuccinia Lobeliae.**

Add the exsiccati: Barth. N. Am. Ured. *3051.*

571. **Micropuccinia Xanthii.**

Add the hosts:

Xanthium oviforme Wallr., South Dakota.
Xanthium speciosum Kearney, Montana, South Dakota.

Add the exsiccati: Barth. N. Am. Ured. *2781*, *2782*, *2873*, *2975*, *3080*, *3081*, *3082*, *3083*, *3276*, *3277*, *3480;* Brenckle, Fungi Dak. *567.*

574. **Micropuccinia Virgaureae.**
Add the synonym: *Puccinia Virgaureae* Corda, Ic. Fung. **4**: 14. 1840.

575. **Micropuccinia Asteris.**
Add the synonym: *Puccinia suffulta* Berk. & Curt. Grevillea **3**: 55. 1874.
Add the hosts:

Aster frondeus (A. Gray) Greene, Montana.
Aster gracilis Nutt., Georgia.
Aster junciformis Rydb., Alberta.

Add the exsiccati: Barth. N. Am. Ured. *2827*, *2828*, *2931*, *3032*, *3226*, *3450;* Brenckle, Fungi Dak. *562*.

576. **Micropuccinia Grindeliae.**
Add the synonym: *Puccinia Solidaginis-mollis* Dietel, Ann. Myc. **4**: 308. 1906.
Among the hosts, for "*Erigeron filiformis*" read "*Erigeron filifolius.*"
Add the hosts:

Solidago missouriensis Nutt., Washington.
Stenotus acaulis Nutt. (*Aplopappus acaulis* A. Gray), Wyoming.

Add the exsiccati: Barth. N. Am. Ured. *2775*, *3044*, *3045*, *3046*, *3143*, *3247*, *3349*, *3350*.

580. **Micropuccinia Rudbeckiae.**
Under exsiccati, supply the number: *2862*.

581. **Micropuccinia Silphii.**
Add the host: *Silphium asperrimum* Hook., Texas.
Add the exsiccati: Barth. N. Am. Ured. *2965*.

581. **Micropuccinia Melampodii.**
Add the synonym: *Puccinia Wedeliae* Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 528. 1913.
Add the illustrations: Mém. Soc. Neuch. Sci. Nat. **5**: 528. *f. 46;* 529. *f. 47*.

582. **Micropuccinia Millefolii.**
Add the hosts:

Achillea borealis Bong., Alaska.
Artemisia Purshiana Besser, South Dakota.

Add the exsiccati: Barth. N. Am. Ured. *2836*, *2953*.

583. **Micropuccinia expansa.**
Add the host: *Senecio dimorphophyllus* Greene, Wyoming.

585. **Micropuccinia Suksdorfii.**
Change the second synonym to read "*Dicaeoma Suksdorfii*," not "*Caeomurus Suksdorfii.*"
After *Agoseris* sp. for "Wyoming" read "Nevada."
Add the exsiccati: Barth. N. Am. Ured. *3171*.

585. **Micropuccinia Fraseri.**
Add the exsiccati: Barth. N. Am. Ured. *3345*.

586. PUCCINIA SUFFULTA.
The species is now referred to *Micropuccinia Asteris* (Duby) Arth. & Jackson, and the host is determined as *Aster gracilis* Nutt.

586. Insert, before "Form-Genera":

38. DESMELLA Sydow, Ann. Myc. **16**: 241. 1918.

Cycle of development incompletely known, only uredinia and telia recognized, both subepidermal, usually forming beneath the stomata and protruding in tufts, appearing superficial; probably heteroecious.

Uredinia without peridium or paraphyses. Urediniospores borne singly on pedicels, globoid; wall somewhat colored, echinulate, the pores two to several, equatorial or scattered.

Telia without peridium or paraphyses. Teliospores two-celled; wall somewhat colored, firm, smooth, the pores one in each cell, either apical or in upper part of each cell.

Type species, *Uredo Aneimiae* P. Henn. (on *Aneimia* sp.).

1. **Desmella superficialis** (Speg.) Sydow, Ann. Myc. **16**: 242. 1918.

Caeoma superficialis Speg. Anal. Soc. Ci. Argent. **17**: 96. 1884.
Uredo superficialis De-Toni, in Sacc. Syll. Fung. **7**: 865. 1888.
Uredo Gymnogrammes P. Henn. Hedwigia **34**: 337. 1895.
Uredo blechnicola P. Henn. Hedwigia **43**: 165. 1904.
Uredo Nephrolepidis Dietel; Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 576. 1913.
Desmella Gymnogrammes Sydow, Ann. Myc. **16**: 242. 1918.

II. Uredinia hypophyllous, scattered, round, minute, 0.1–0.3 mm. in diameter, pulverulent, yellow fading to white, ruptured epidermis inconspicuous, usually protruding through the stomata in tufts for about one half length of pedicels, appearing superficial; urediniospores globoid or somewhat obovoid, 18–24 by 21–28 μ; wall very pale-yellow, 1–2.5 μ thick, sparsely and evenly echinulate, the pores obscure, probably 4 and equatorial.

III. Telia unknown.

ON POLYPODIACEAE:
Adiantum latifolium Lam., Porto Rico.
Dennstaedtia rubiginosa (Kaulf.) Moore, Porto Rico.
Dryopteris dentata (Forsk.) C. Chr. (*D. mollis* Hieron.), Porto Rico.
Dryopteris l'Herminieri (Kunze) C. Chr., Grenada.
Dryopteris patens (Sw.) Kuntze, Jamaica.
Dryopteris Poiteana (Bory) Urban, Porto Rico.
Dryopteris subtetragona (Link) Maxon (*D. tetragona* Urban), Porto Rico.
Pityrogramma calomelanos (L.) Link (*Gymnogramma calomelanos* Kaulf.), Cuba; Porto Rico.
Tectaria martinicensis (Spreng.) Copeland, Porto Rico.
ON SCHIZAEACEAE:
Aneimia hirsuta (L.) Sw., Jamaica.
TYPE LOCALITY: Near Mbatobi, Paraguay, on *Blechnum* sp.
DISTRIBUTION: West Indies; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. **5**: 577, *f. 83*.

39. DASYSPORA Berk. & Curt. Jour. Acad. Phila. **2**: 281. 1853.

(Not *Dasyspora* Arth. 1906.)

Cycle of development includes pycnia, aecia, and telia; autoecious. Pycnia and telia subepidermal, aecia hyphoid, seemingly superficial.

Pycnia globoid-hemispheric; ostiolar filaments short or wanting.

Aecia without definite sori, the fertile hyphae in tufts protruding above the epidermis, sympodially branched, colorless. Aeciospores borne singly on short pedicels, globoid or ellipsoid; wall colorless, finely verrucose, the pores indistinct.

Telia erumpent, definite. Teliospores pedicelled, free, two-celled; wall colored, firm, verrucose, most strongly at opposite ends, the pores uncertain.

Type species, *Dasyspora foveolata* Berk. & Curt. (on *Xylopia* sp.).

1. **Dasyspora foveolata** (Schw.) Berk. & Curt. Jour. Acad. Phila. **2**: 281. 1853.

Aecidium foveolatum Schw.; Berk. & Curt. Jour. Acad. Phila. **2**: 281, as synonym. 1853.
Puccinia compacta Thüm. Flora **1875**: 364. 1875. Not *P. compacta* Berk. 1855.
Puccinia Winteri Paz. Hedwigia **29**: 158. 1890.
Puccinia foveolata P. Henn. Hedwigia **34**: 95. 1895.
Puccinia gregaria Kunze; P. Henn. Hedwigia **35**: 230. 1896.
Oidium parasiticum Kunze; P. Henn. Hedwigia **35**: 231, as synonym. 1896.
Dicaeoma Winteri Kuntze, Rev. Gen. **3**^{3}: 471. 1898.

O. Pycnia epiphyllous, crowded in small groups 0.5–2 mm. across, opposite the uredinia, mammilliform, prominent, becoming dark-brown, in section globoid-hemispheric, 130–190 μ broad; ostiolar filaments short, scarcely or not exserted.

I. Aecia hypophyllous, in radiating mold-like areas 1–3 mm. across, or up to 8 mm. along the leaf-midrib, without a distinct hymenium, the fertile hyphae protruding through the stomata and rising above the leaf-surface 100–150 μ in sympodially branched tufts, snowy-white, becoming dirty-white with age; aeciospores broadly ellipsoid, 14–18 by 25–27 μ; wall colorless, 1–1.5 μ thick, with a thicker ring at the hilum, granulose-verrucose below, becoming tuberculate-verrucose above.

III. Telia hypophyllous, crowded in groups 2–8 mm. across, early naked, chestnut-brown, becoming pulverulent, ruptured epidermis noticeable; teliospores broadly ellipsoid or oblong, 19–23 by 26–30 μ exclusive of appendages, rounded above and below, somewhat constricted at septum; wall chestnut-brown, uniformly 1.5–2.5 μ thick, coarsely tuberculate on sides, gradually merging into filiform appendages at each end, 6–8 μ long; pedicel colorless, fragile, as long as spore or shorter.

ON ANNONACEAE:
Xylopia frutescens Aubl., Costa Rica.
Xylopia grandiflora St. Hil., Panama.
Xylopia sp., Guatemala.
TYPE LOCALITY: Surinam, on "living leaves" [*Xylopus* sp.].
DISTRIBUTION: Eastern Guatemala to Panama; also in South America.
ILLUSTRATIONS: Jour. Acad. Phila. **2**: *pl. 25, f. 5;* Ber. Deuts. Bot. Ges. **10**: 196; Mycologia **17**: 260, *f. 1.*

587. In the key.

Replace line 6 by:

Teliospores globoid.	
Teliospore-wall thicker above.	4. *U. Sabineae.*
Teliospore-wall uniformly thick.	4*a*. *U. punctiformis.*

Insert after line 7:

Host belonging to family Malpighiaceae.	5*a*. *U. Standleyanus.*

Replace line 11 by:

Host belonging to family Acanthaceae.	
Teliospore-wall thicker above.	8. *U. Hariotanus.*
Teliospore-wall evenly thick.	8*a*. *U. Anthacanthi.*

587. **Uromyces guatemalensis.**

Add the host: *Bauhinia ungulata* L., Salvador.

588. Insert:

4a. **Uromyces punctiformis** Sydow, Ured. *1513.* 1901.

II. Uredinia amphigenous, few, scattered, small, 0.2–0.4 mm. across, round, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores obovoid, 19–21 by 24–26 μ; wall thin, 1 μ, golden-brown, minutely and moderately echinulate, the pores 2, equatorial.

III. Telia amphigenous, chiefly epiphyllous, numerous, scattered, small, 0.2–0.4 mm. across, early naked, pulverulent, blackish, ruptured epidermis noticeable; teliospores globoid, 22–26 by 26–28 μ; wall chestnut-brown, uniformly thick, 2.5–3 μ, the pore covered by a broad cinnamon-brown umbo 8–10 μ thick, closely and minutely verrucose, best seen when dry; pedicel colorless, persistent, 40–65 μ long.

ON FABACEAE:
Vigna strobiliphora B. L. Robinson, Jalisco.
TYPE LOCALITY: Guadalajara, Mexico.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Sydow, Ured. *1513.*

588. Insert:

5a. **Uromyces Standleyanus** Arth. Bull. Torrey Club **51**: 57. 1924.

II. Uredinia hypophyllous, scattered or closely gregarious, round, 0.3–0.5 mm. in diameter, soon naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores broadly ellipsoid or obovate, 23–26 by 29–32 μ; wall pale golden-brown with a colorless outer layer becoming evident in lactic acid, moderately thick, 3 μ, strongly

and sparsely echinulate, the points 3–5 μ apart, the pores indistinct, apparently 3, approximately equatorial.

III. Telia hypophyllous, scattered, round, about 0.5 mm. in diameter, soon naked, pulvinate, cinnamon-brown, slightly darker than the uredinia, ruptured epidermis inconspicuous; teliospores obovate or cuneiform, 15–19 by 38–42 μ, rounded above, narrowed below, germinating at maturity; wall pale cinnamon-brown, thin, 1 μ, greatly thickened above, 12–16 μ, smooth; pedicel colorless, fragile, length of spore or less.

ON MALPIGHIACEAE:
Gaudichaudia Schiedeana Juss., Salvador.
TYPE LOCALITY: Near Tonacatepeque, Department of San Salvador, Salvador, on *Gaudichaudia Schiedeana*.
DISTRIBUTION: Known only from the type locality.

589. Insert:

8a. **Uromyces Anthacanthi** H. S. Jackson; Seaver, Mycologia **16**: 47. 1924.

II. Uredinia epiphyllous, closely gregarious and arranged in a concentric manner on areas 5–8 mm. across, tardily naked, cinnamon-brown, ruptured epidermis conspicuous and at first overarching; urediniospores obovoid, 20–26 by 26–30 μ; wall thin, 1–1.5 μ, golden-yellow, finely and moderately echinulate, the pores obscure, apparently 2, slightly superequatorial.

III. Telia arranged like the uredinia, chestnut-brown; teliospores globoid or broadly ellipsoid, 20–24 by 26–30 μ, rounded above and below; wall chestnut-brown, uniformly 1.5–2.5 μ thick, finely and rather inconspicuously verrucose; pedicel colorless, as long as the spore or shorter.

ON ACANTHACEAE:
Anthacanthus spinosus (L.) Nees, St. Croix.
TYPE LOCALITY: St. Croix, Virgin Islands, on *Anthacanthus spinosus*.
DISTRIBUTION: Known only from the type locality.

591. **Puccinia Heliconiae.**
Add the host: *Bihai pendula* (Wawra) Kuntze (*Heliconia pendula* Wawra), Panama.

593. **Puccinia Marsdeniae.**
Insert: ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 48, f. 153a, b.*

594. **Puccinia Antirrhini.**
Add the exsiccati: Barth. N. Am. Ured. *3224, 3334, 3449.*

603. **Puccinia Eriophylli.**
Add the host: *Eriophyllum integrifolium* (Hook.) Greene, Wyoming.

605. In the key.

Replace line 2 by:

Host belonging to family Araceae.	
Urediniospore-wall uniformly thin.	2. *U. Anthurii.*
Urediniospore-wall slightly thicker above.	2a. *U. jucunda.*

Replace line 3 by:

Host belonging to family Commelinaceae.	
Urediniospores small, 19–29 μ long.	3. *U. Commelyneae.*
Urediniospores large, 29–32 μ long.	3a. *U. Campeliae.*

Insert after line 19:

Host belonging to family Urticaceae.	14a. *U. Rousseliae.*

Replace line 35 by:

Urediniospores large (24–32 μ), wall cinnamon-brown.	
Pores 2, rarely 3.	26. *U. lutea.*
Pores 3 or 4.	26a. *U. ramonensis.*

Insert after line 43:

Host belonging to family Anacardiaceae.	33a. *U. Mauriae.*

Insert after line 49:

Host belonging to family Terminaliaceae.	39a. *U. Buchenaviae.*

Replace line 50 by:

Host belonging to family Onagraceae.	
Urediniospores small, 18–24 μ long.	40. *U. Fuchsiae.*
Urediniospores large, 24–32 μ long.	40a. *U. guaynabensis.*

606. In the key.

Replace line 2 by:

Urediniospore-wall thicker, 1–1.5 μ.	
Urediniospore-pores 4.	54. *U. Cephalanthi.*
Urediniospore-pores 2 or 3.	54a. *U. Borreriae.*

606. Insert:

2a. **Uredo jucunda** Sydow, Ann. Myc. **23**: 324. 1925.

II. Uredinia hypophyllous, in somewhat dense or subconcentric groups on slightly discolored spots, ruptured epidermis conspicuous, small, 0.15–0.25 mm. across; peridium and paraphyses none; urediniospores variable in form and size, obovate-oblong or elongate-ellipsoid, 21–25 by 30–46 μ; wall at first nearly or quite colorless becoming fuscous, 1.5–2.5 μ thick, frequently somewhat thicker at apex and base, the pores obscure.

ON ARACEAE:
Philodendron tripartitum (Jacq.) Schott, Costa Rica.
TYPE LOCALITY: San Pedro de San Ramón, Costa Rica, on *Philodendron tripartitum*.
DISTRIBUTION: Known only from the type locality.

606. Insert:

3a. **Uredo Campeliae** Kern & Whetzel, Mycologia **18**: 40. 1926.

II. Uredinia chiefly hypophyllous, scattered, small, roundish or oval, 0.2–0.4 mm. across, rather long covered by the epidermis, dingy yellow; urediniospores broadly ellipsoid, 22–27 by 29–32 μ, the wall pale-yellow or colorless, thin, about 1.5 μ, sparsely and strongly echinulate with points 2–3 μ apart, the pores 2, equatorial.

ON COMMELINACEAE:
Campelia Zanonia (L.) H.B.K., Porto Rico.
TYPE LOCALITY: Hacienda Limon near Villa Alba, Porto Rico.
DISTRIBUTION: Known only from the type locality.

607. **Uredo Guacae.**

Add the host: *Epidendrum corymbosum* Lindl., Porto Rico.

609. Insert:

14a. **Uredo Rousseliae** Kern & Whetzel, Mycologia **18**: 40. 1926.

II. Uredinia hypophyllous, numerous, scattered or crowded in small irregular groups, small, 0.1–0.2 mm. across, with imbricated incurved paraphyses united at their bases forming a pseudo-peridium opening by a central pore, pale-brown; urediniospores broadly ellipsoid, 16–19 by 20–27 μ, the wall colorless, thin, 1–1.5 μ, finely and closely verrucose, the pores obscure.

ON URTICACEAE.
Rousselia humilis (Sw.) Urban, Porto Rico.
TYPE LOCALITY: Hacienda Limon near Villa Alba, Porto Rico.
DISTRIBUTION: Known only from the type locality.

611. Insert:

26a. **Uredo ramonensis** Sydow, Ann. Myc. **23**: 325. 1925.

II. Uredinia hypophyllous, scattered or in small groups, round, about 0.5 mm. in diameter, tardily naked, dark cinnamon-brown; peridium and paraphyses none; urediniospores obovate or ellipsoid, 18–23 by 24–32 μ; wall cinnamon-brown, paler below, thin, 1–1.5 μ, the pores 3 or 4, equatorial.

ON CAESALPINIACEAE:
Chamaefistula bacillaris (L. f.) G. Don (*Cassia bacillaris* L. f.), Costa Rica.
TYPE LOCALITY: San Pedro de San Ramón, Costa Rica, on *Cassia bacillaris*.
DISTRIBUTION: Known only from the type locality.

613. Insert:

33a. **Uredo Mauriae** Sydow, Ann. Myc. **23**: 325. 1925.

II. Uredinia hypophyllous on small, brownish spots 1–3 mm. across, scattered or somewhat concentric, minute, 0.1–0.15 mm. in diameter, early naked, somewhat waxy, chestnut-brown; paraphyses peripheral, abundant, cylindric, upright or incurved, 7–10

by 25–45 μ, the wall thick, nearly closing the lumen, almost colorless; urediniospores variable, elongate-ellipsoid, reniform or angular, 13–17 by 20–26 μ; wall cinnamon-brown, thin, 1 μ, minutely and densely verrucose-echinulate, often extending at the middle into low blunt processes, the pores 2, equatorial.

ON ANACARDIACEAE:
Mauria glauca Donn. Sm., Costa Rica.
TYPE LOCALITY: La Caja near San José, Costa Rica, on *Mauria glauca*.
DISTRIBUTION: Known only from the type locality.

614. **Uredo Cupheae.**

Add the host: *Parsonia Balsamona* (Cham. & Schlecht.) Arth. (*Cuphea Balsamona* Cham. & Schlecht.), Costa Rica.

614. Insert:

39a. **Uredo Buchenaviae** Kern & Whetzel, Mycologia **18**: 41. 1926.

II. Uredinia hypophyllous, few, scattered, very small, 0.1 mm. or less across, without peridium or paraphyses, long covered by the epidermis, punctiform, light yellowish-brown; urediniospores broadly ellipsoid or obovoid, often angular, 16–23 by 23–29 μ, the wall pale cinnamon-brown, 1–1.5 μ thick, moderately echinulate, the pores obscure, probably 2, equatorial.

ON TERMINALIACEAE:
Buchenavia capitata (Vahl) Eichl., Porto Rico.
TYPE LOCALITY: Reservoir road near Guaynabo, Porto Rico.
DISTRIBUTION: Known only from the type locality.

614. Insert:

40a. **Uredo guaynabensis** Kern & Whetzel, Mycologia **18**: 41. 1926.

II. Uredinia hypophyllous, scattered, roundish or oval, 0.2–0.4 mm. across, tardily naked, light chestnut-brown; urediniospores broadly ellipsoid or obovoid, often more or less irregular or angular, 18–23 by 24–32 μ (occasionally up to 37 μ) long, the wall thin, about 1 μ, golden-brown, moderately echinulate, the pores 2, equatorial or superequatorial.

ON ONAGRACEAE:
Jussiaea angustifolia Lam. (*J. suffruticosa* Auth. not L.), Cuba, Porto Rico.
Jussiaea peruviana L., Cuba.
TYPE LOCALITY: Demonstration Farm, near Guaynabo, Porto Rico.
DISTRIBUTION: West Indies.

616. **Uredo contraria.**

Add the exsiccati: Barth. N. Am. Ured. *3376*.

616. **Uredo Nicotianae.**

Change the citation for this name to read: Anast., Sacc. & Splend.; Anast. & Splend. Boll. Tecn. Tabac. Ist. Scafati **3**[4]: 53. 1904.

Change the type locality to read: Experimental garden at Scafati, Italy, on *Nicotiana quadrivalvis*.

Change the distribution to read: California; also in Italy.

Add: ILLUSTRATION: Boll. Tecn. Tabac. Ist. Scafati: **3**[4]: *pl.*

617. Insert:

54a. **Uredo Borreriae** (P. Henn.) Kern & Whetzel, Mycologia **18**: 42. 1926.

Uromyces Borreriae P. Henn. Hedwigia **35**: 227. 1896.

II. Uredinia amphigenous, scattered, round, 0.3–0.5 mm. in diameter, tardily naked, cinnamon-brown, the overarching epidermis breaking away irregularly; urediniospores broadly ellipsoid or obovate, 19–21 by 24–29 μ; wall cinnamon-brown, 1–1.5 μ thick, moderately and finely echinulate, the pores 2 or 3, equatorial.

ON RUBIACEAE:
Borreria verticillata (L.) G. Meyer, Porto Rico.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Borreria verticillata*.
DISTRIBUTION: Porto Rico; also in South America.

619. In the key.

Insert after line 12:

Host belonging to family Polygonaceae.	10*a*. *A. minutulum.*

Insert after line 17:

Host belonging to family Annonaceae.	14*a*. *A. Anonae.*

620. In the key.

Replace line 47 by:

Aeciospore-wall colorless.	
Aeciospore-wall moderately verrucose.	66. *A. Farameae.*
Aeciospore-wall coarsely verrucose.	66*a*. *A. Psychotriae.*

Insert after line 48:

Host belonging to family Valerianaceae.	67*a*. *A. Valerianellae.*

Replace line 55 by:

Aeciospore-wall 1 μ thick.	
Outer peridial wall thin, 2–3 μ.	71. *A. ampliatum.*
Outer peridial wall thick, 6–12 μ.	71*a*. *A. Mikaniae.*

Replace line 62 by:

Peridial cells slightly or not imbricated.	
Outer wall 6–10 μ thick.	75. *A. Batesii.*
Outer wall 2–3 μ thick.	75*a*. *A. poasense.*

623. Insert:

10a. **Aecidium minutulum** H. S. Jackson; Barth. N. Am. Ured. *3401.* 1926.

O. Pycnia amphigenous, chiefly epiphyllous, subepidermal, globoid, 95–115 μ in diameter; ostiolar filaments short or wanting.

I. Aecia amphigenous, chiefly hypophyllous, in large irregularly concentric groups 3–6 mm. across on yellowish spots, cupulate; peridium pale-yellow, the margin revolute, becoming lacerate; peridial cells rhomboidal, considerably overlapping, 16–18 by 30–34 μ, the outer wall transversely striate, 3–4 μ thick, the inner wall 1.5–2 μ thick, closely and finely tuberculate-verrucose; aeciospores angularly globoid, 14–16 μ in diameter; wall colorless, thin, 1 μ, very minutely verrucose, appearing smooth.

ON POLYGONACEAE:
Rumex sp., Texas.
TYPE LOCALITY: Wichita Falls, Texas, on *Rumex* sp.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *3401.*

624. Insert:

14a. **Aecidium Anonae** P. Henn. Hedwigia **34**: 100. 1895.

Aecidium anonaceicola P. Henn. **34**: 101. 1895.

O. Pycnia epiphyllous, numerous, densely distributed on yellowish-brown spots opposite the aecia, at first yellowish-brown, becoming darker, flattened-globoid or lenticular, 130–150 μ broad by 70–95 μ high; ostiolar filaments not conspicuous.

I. Aecia hypophyllous, crowded in groups or arranged in irregular annular manner on slightly hypertrophied areas 0.3–1 cm. across; peridium firm, pale-yellow, cupulate, the margin revolute, lacerate; peridial cells rhombic, 15–18 by 18–24 μ, slightly overlapping, the outer wall 4–5 μ thick, smooth, the inner wall 2–3 μ thick, minutely verrucose; aeciospores angularly globoid or ellipsoid, 15–20 by 20–24 μ; wall colorless, 1–1.5 μ thick, closely and inconspicuously verrucose.

ON ANNONACEAE:
Annona Spraguei Safford, Panama.
TYPE LOCALITY: Goyaz near Meiaponte, Brazil, on *Anona* sp.
DISTRIBUTION: Panama; also in South America.

635. **Aecidium Verbenae.**

Add the host: *Lantana hispida* H.B.K., Costa Rica.

639. **Aecidium pulverulentum.**

Add the host: *Randia spinosa* (Jacq.) Karst., Panama.

639. Insert:

66a. **Aecidium Psychotriae** P. Henn. Hedwigia **43**: 166. 1904.

O. Pycnia epiphyllous, densely grouped in center of yellowish spots, conspicuous, brownish, ovoid, 95–125 μ broad by 130–160 μ high; ostiolar filaments short.

I. Aecia hypophyllous, scattered on yellowish spots 5–1.5 mm. across, cupulate; peridium colorless or pale-yellow, the margin erect, erose; peridial cells irregularly rhomboidal in side view, 12–16 by 26–32 μ, strongly overlapping, the outer wall 3–4 μ thick, smooth, the inner wall 2.5–3 μ thick, strongly verrucose; aeciospores angularly globoid or oblong, 18–26 by 26–32 μ; wall colorless, 1.5–2 μ in thickness, greatly thickened above, 8–16 μ, strongly verrucose.

ON RUBIACEAE:
Psychotria pinularis Sessé & Moc., Costa Rica; Panama.
TYPE LOCALITY: Cerro de Isco, Peru, on *Psychotria* sp.
DISTRIBUTION: Costa Rica; also in South America.

640. Insert:

68a. **Aecidium Valerianellae** Biv. Stirp. Rar. Sic. **4**: 28. 1816.

Aecidium Fediae Berg. Giorn. Fis. Chim. Pavia **7**: 281. 1824.
Aecidium Valerianellae P. Henn. Hedwigia **37**: 272. 1898.
Aecidium Velenovskyi Bubák, Sitz.-ber. Böhm. Ges. Wiss. **1900**[7]: 4. 1900.
Aecidium balearicum Gonz. Frag. Trab. Mus. Nac. Ci. Nat. Madr. Bot. **15**: 225. 1918.

O. Pycnia hypophyllous, numerous, scattered among the aecia, yellowish becoming dark-brown or blackish, punctiform, noticeable, subepidermal.

I. Aecia hypophyllous, from diffused mycelium, thickly scattered over the lower surface, cylindric or somewhat cupulate, 0.25–0.35 mm. in diameter, 0.2–0.3 mm. high, the margin revolute, coarsely lacerate; peridial cells rhomboidal, 16–22 by 20–35 μ, the outer wall 3–6 μ thick, transversely striate, smooth, the inner wall 2–3 μ thick, verrucose; aeciospores globoid or broadly ellipsoid, 13–18 by 15–23 μ; wall colorless or pale-yellowish, thin, 1–1.5 μ, minutely verrucose.

ON VALERIANACEAE:
Valeriana congesta Lindl., California, Washington.
TYPE LOCALITY: Sicily, on *Valerianella campanulata*.
DISTRIBUTION: Southern Washington to central California; also in Europe.

641. Insert:

71a. **Aecidium Mikaniae** P. Henn. Hedwigia **35**: 261. 1896.

Aecidium expansum Dietel, Hedwigia **38**: 258. 1899.

O. Pycnia not seen.

I. Aecia hypophyllous, in small or large groups 1 to 8 mm. across, cupulate, small, 0.3–0.5 mm. in diameter; peridium pale-yellow, the margin erect, erose; peridial cells irregularly oblong, 16–22 by 25–40 μ, very slightly overlapping, the outer wall thick, 7–10 μ, transversely striate, smooth, the inner wall thinner, 4–6 μ, finely verrucose; aeciospores globoid, 16–20 μ; wall thin, 1 μ or less, very finely and obscurely verrucose, appearing smooth.

ON CARDUACEAE:
Mikania houstoniana (L.) B. L. Robinson, Honduras.
TYPE LOCALITY: Santa Catharina near Blumenau, Brazil, on *Mikania confertissima*.
DISTRIBUTION: Honduras; also in South America and central Africa.

642. Insert:

75a. **Aecidium poasense** Sydow, Ann. Myc. **23**: 324. 1925.

O. Pycnia not seen.

I. Aecia amphigenous, on thickened spots 2–5 mm. across, deep seated, 0.2–0.25 mm. in diameter; peridium scarcely protruding; peridial cells rhomboidal or oblong, 12–18 by 28–35 μ, abutted, easily falling apart, the outer wall thin, 2–3 μ, finely verrucose,

the inner wall 1–1.5 μ thick, nearly or quite smooth; aeciospores globoid or broadly ellipsoid, 16–18 by 17–23 μ; wall colorless, thin, 1 μ, densely and minutely verrucose.

ON CARDUACEAE:
Otopappus verbesinoides Benth., Costa Rica.
TYPE LOCALITY: Near Grecia, on Mt. Poás, Costa Rica, on *Otopappus verbesinoides*.
DISTRIBUTION: Known only from the type locality.

647. **Peridermium coloradense.**
Add the exsiccati: Barth. N. Am. Ured. *3329*, *3444*.

ADDENDA

The following exsiccati were omitted from their proper places in the additions and corrections on pages 649–796 (parts 9–11 of this volume). All the numbers are from Barth. N. Am. Ured.

650. **Coleosporium ribicola.** *3310*, *3311*.
652. **Coleosporium Ipomoeae.** *3308*, *3309*, *3405*.
653. **Coleosporium Campanulae.** *3305*.
Coleosporium Vernoniae. *3306*.
654. **Coleosporium aridum.** *3404*.
655. **Coleosporium Laciniariae.** *3406*.
Coleosporium Solidaginis. *3312*, *3407*.
658. **Coleosporium Helianthi.** *3307*.
664. **Melampsora Abietis-canadensis.** *3437*.
666. **Uredo Bigelowii.** *3321*, *3322*, *3438*, *3439*.
667. **Melampsora confluens.** *3323*.
668. **Melampsora Humboldtiana.** *3324*.
670. **Melampsora monticola.** *3325*, *3440*.
674. **Bubakia Crotonis.** *3304*, *3403*.
677. **Pucciniastrum americanum.** *3481*.
Pucciniastrum pustulatum. *3374*, *3482*, *3483*.
678. **Pucciniastrum sparsum.** *3484*.
680. **Melampsoridium Alni.** *3326*.
681. **Melampsorella elatina.** *3441*.
688. **Melampsoropsis Pyrolae.** *3442*, *3443*.
690. **Melampsoropsis abietina.** *3327*.
691. **Chrysomyxa Arctostaphyli.** *3328*.
691. **Cronartium Comptoniae.** *3404*.
692. **Cronartium ribicola.** *3313*, *3314*, *3412*.
694. **Cronartium coleosporioides.** *3330*, *3331*, *3409*, *3410*, *3411*, *3445*.
701. **Endophyllum tuberculatum.** *3315*, *3413*.
717. **Ravenelia epiphylla.** *3375*.
724. **Uropyxis Amorphae.** *3400*.
726. **Phragmidium Rosae-acicularis.** *3447*.
Phragmidium montivagum. *3332*, *3446*.
729. **Gymnoconia interstitialis.** *3316*, *3414*, *3415*.
730. **Kuehneola Uredinis.** *3320*, *3436*.
737. **Gymnosporangium inconspicuum.** *3427*, *3428*, *3429*.
Gymnosporangium Harknessianum. *3425*, *3426*.
192. **Gymnosporangium multiporum.** *3432*.
754. **Nigredo Junci-effusi.** *3495*.
769. **Nigredo Spermacoces.** *3397*, *3398*.
776. **Dicaeoma Stipae.** *3369*.
Dicaeoma scaber. *3363*.
778. **Dicaeoma pygmaeum.** *3358*.
315. **Dicaeoma Cynodontis.** *3455*.

786. **Dicaeoma minutissimum** (not **D. Trientalis**, as stated on page 787). *3370.*
787. **Dicaeoma Peckii.** *3356.*
410. **Dicaeoma caulicola.** *3338.*
794. **Dicaeoma (?) Stephanomeriae.** *3368.*

The following exsiccati were entered in the additions and corrections by number, but the host-names have not been mentioned.

739. **Gymnosporangium gracilens.**
Fendlera tomentella Thornb., Colorado (*3423*).
780. **Dicaeoma abundans.**
Symphoricarpos mollis Nutt., California (*3333*).

ADDITIONAL LOCALITIES

The localities in the following list are in addition to those mentioned in the preceding pages for the same species and host. When wholly or partly represented by exsiccati the localities are printed in *italics*.

87. **Coleosporium apocynaceum.**
Amsonia ciliata Walt., Florida, *Georgia.*
Coleosporium Plumierae.
Plumiera alba L., Panama; Porto Rico.
Plumiera rubra L., Guatemala; Santo Domingo.
Coleosporium Ipomoeae.
Calonyction aculeatum (L.) House, Alabama.
Ipomoea Batatas Lam., Porto Rico.
Ipomoea lacunosa L., *Alabama, Arkansas.*
Ipomoea pandurata (L.) Meyer, *Arkansas*, Kentucky, *North Carolina*, Virginia.
Ipomoea speciosa Walt., Bermuda.
Pharbitis cathartica (Poir.) Choisy, Cuba.
Pharbitis hederacea (L.) Choisy, *Arkansas*, Delaware, *Kentucky*, Mississippi, New Jersey, *Oklahoma, Tennessee;* Costa Rica; Porto Rico; St. Croix.
Pharbitis purpurea (L.) Voigt, *Arkansas*, Delaware, *Illinois, Louisiana, Missouri, Pennsylvania*, South Carolina.
Quamoclit coccinea (L.) Moench, Porto Rico.
Thyella tamnifolia (L.) Raf., Cuba; Porto Rico.

88. **Coleosporium Campanulae.**
Pinus rigida Mill., Maryland, New Jersey, North Carolina.
Campanula rapunculoides L., Connecticut, New Jersey.
Campanulastrum americanum (L.) Small, Illinois, Indiana, Kentucky, Michigan, Mississippi, *Missouri.*

89. **Coleosporium Vernoniae.**
Vernonia altissima Nutt., Arkansas, Louisiana, Mississippi, South Carolina, Tennessee.
Vernonia angustifolia Michx., Florida.
Vernonia Baldwinii Torr., Illinois, Mississippi, *Oklahoma*, Texas.
Vernonia crinita Raf., *Arkansas.*
Vernonia fasciculata Michx., Iowa, Mississippi, *Nebraska*, Oklahoma.
Vernonia flaccidifolia Small, Florida, Tennessee.
Vernonia gigantea (Nutt.) Britton, *Arkansas, Delaware*, Georgia, *Illinois*, Kentucky, Mississippi, *Tennessee.*
Vernonia glauca (L.) Britton, *Arkansas, Kentucky, West Virginia.*
Vernonia interior Small, Arkansas, *Iowa, Kansas*, Nebraska, Texas.
Vernonia missourica Raf., *Illinois, Tennessee.*

Vernonia noveboracensis (L.) Willd., Delaware, Georgia, *Illinois*, Indiana, Maryland, *Ohio*, South Carolina, Virginia.
Vernonia ovalifolia T. & G., Louisiana.
Vernonia texana (A. Gray) Small, Louisiana.

Coleosporium Elephantopodis.
Elephantopus carolinianus Willd., Delaware, Indiana, *Maryland*, *North Carolina*, *Ohio*, *Texas*, *West Virginia*.
Elephantopus mollis H.B.K., Santo Domingo.
Elephantopus nudatus A. Gray, *Georgia*.
Elephantopus tomentosus L., *Georgia*, *Louisiana*.

90. **Coleosporium Eupatorii.**
Eupatorium collinum DC., Costa Rica.
Eupatorium macrophyllum L., Porto Rico.

Coleosporium Laciniariae.
Laciniaria graminifolia (Walt.) Kuntze, *Georgia*, New Jersey.

Coleosporium Solidaginis.
Pinus rigida Mill., Delaware, District of Columbia, *Maryland*, North Carolina, *Pennsylvania*, Tennessee.
Aster chilensis Nees, *North Dakota*.
Aster conspicuus Lindl., Oregon, *Washington*, Wyoming; Alberta.
Aster cordifolius L., Connecticut, Iowa, Maine, Vermont, West Virginia; *Ontario*.
Aster divaricatus L., Connecticut, New Hampshire, New York.
Aster ericoides L., Indiana, Kentucky, *Ohio*.
Aster laevis L., Colorado, Connecticut, Idaho, Montana, *Nebraska*, New York, North Dakota, Washington; Ontario.
Aster lateriflorus (L.) Britton, Connecticut, *Illinois*, Maine, Michigan, Tennessee.
Aster Lindleyanus T. & G., *Ontario*.
Aster longifolius Lam., Indiana.
Aster macrophyllus L., Connecticut, West Virginia; Ontario.
Aster multiflorus Ait., Colorado, New York.
Aster Novae-Angliae L., *Nebraska*.
Aster Novi-Belgii L., New York, Rhode Island, Virginia.
Aster paniculatus Lam., Connecticut, Delaware, Michigan, *Missouri*, *Nebraska*, New York, *North Dakota*, *Pennsylvania*, *South Dakota*, *Wisconsin*.
Aster patens Nutt., Nova Scotia.
Aster prenanthoides Muhl., Pennsylvania.
Aster puniceus L., Connecticut, Iowa, Maine, Massachusetts, Nebraska, *New York*, Pennsylvania, Rhode Island, Vermont.
Aster sagittifolius Willd., *Illinois*, Maine, Mississippi, Vermont, *Wisconsin; Ontario*.
Aster salicifolius Lam., *Idaho*, *Kentucky*, *New York*.
Aster Tradescanti L., Pennsylvania.
Aster vimineus Lam., Connecticut, New York.
Callistephus hortensis Cass., Connecticut, Indiana; *Ontario*.
Solidago arguta Ait., Connecticut.
Solidago bicolor L., Connecticut, Indiana, Maine, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Vermont, Virginia.
Solidago caesia L., *Arkansas*, Connecticut, Kentucky, Missouri, *New Hampshire*, New Jersey, Pennsylvania, Rhode Island.
Solidago canadensis L., *Arkansas*, Connecticut, Delaware, Maryland, Massachusetts, Mississippi, *Montana*, Nebraska, *New Hampshire*, North Carolina, *North Dakota*, *Pennsylvania*, *South Carolina*, Vermont, Virginia, *Wisconsin; Ontario*.
Solidago Elliottii T. & G., New York.
Solidago flexicaulis L., Connecticut, *Kentucky*, Maryland, Missouri, Tennessee, Virginia; *Ontario*.

Solidago glaberrima Martens, Alberta.
Solidago juncea Ait., Connecticut, Indiana, Maine, Michigan, New Jersey, Pennsylvania, Tennessee.
Solidago missouriensis Nutt., Nebraska, Oregon.
Solidago multiradiata scopulorum A. Gray, Colorado.
Solidago nemoralis Ait., *Arkansas*, Connecticut, Iowa, Missouri, New York, Pennsylvania, *Tennessee*, Vermont; *Ontario*.
Solidago patula Muhl., New York; Ontario.
Solidago puberula Nutt., New York.
Solidago rugosa Mill., *Arkansas*, Delaware, Massachusetts, Michigan, New Jersey, Pennsylvania.
Solidago sempervirens L., *Maine*, New York; Bermuda.
Solidago serotina Ait., *Arkansas*, Kentucky, *Michigan*, *Minnesota*, Missouri, *Nebraska*, *North Dakota*, *Ohio*, *Wisconsin*.
Solidago uliginosa Nutt., Massachusetts.
Solidago ulmifolia Muhl., *Illinois*, *Kansas*, New York.

92. **Coleosporium Madiae.**
Madia racemosa (Nutt.) T. & G., Oregon.
Madia sativa Molina, Oregon; British Columbia.

93. **Coleosporium Helianthi.**
Helianthus decapetalus L., New York, Pennsylvania.
Coleosporium Terebinthinaceae.
Silphium asperrimum Hook., Mississippi.
Silphium integrifolium Michx., Missouri.
Silphium scaberrimum Ell., North Carolina.
Silphium terebinthinaceum Jacq., *Indiana*.
Silphium trifoliatum L., *Georgia*.

94. **Coleosporium paraphysatum.**
Liabum discolor Benth. & Hook., Salvador.
Coleosporium Senecionis.
Senecio vulgaris L., Colorado.

95. **Gallowaya Pini.**
Pinus virginiana Mill., Delaware.

98. **Uredo Medusae.**
Populus deltoides Marsh., *Arkansas*, Connecticut, Michigan, Minnesota, *North Dakota*, Oklahoma, *South Dakota*, *Texas*, *West Virginia*.

101. **Uredo Lini.**
Linum Lewisii Pursh, Idaho, North Dakota, *South Dakota;* Alberta.
Linum rigidum Pursh, *North Dakota*.
Linum sulcatum Ridd., *North Dakota*, *South Dakota*, *Wyoming*.
Linum usitatissimum L., Connecticut.

102. **Physopella Vitis.**
Vitis vinifera L., Costa Rica; Porto Rico.

104. **Bubakia Crotonis.**
Croton capitatus Michx., *Arkansas*, *Louisiana*, Oklahoma, *Texas*.
Croton monanthogynus Michx., *Arkansas*, *Kentucky*, Mississippi, *Oklahoma*, Tennessee, *Texas*.
Croton punctatus Jacq., Honduras.
Croton texensis (Klotzsch) Muell.-Arg., Arizona.
Crotonopsis linearis Michx., Arkansas, *Tennessee*.

105. **Pucciniastrum Goodyerae.**

Peramium Menziesii (Lindl.) Morong, New Mexico, Oregon.

106. **Pucciniastrum Hydrangeae.**

Hydrangea arborescens L., *Arkansas, Kentucky,* Maryland, Pennsylvania, *Tennessee.*

Pucciniastrum Agrimoniae.

Agrimonia Brittoniana Bickn., *Colorado.*

Agrimonia hirsuta (Muhl.) Bickn., Connecticut, Delaware, Kentucky, Maryland, New Mexico, *North Dakota,* Pennsylvania, South Dakota, Virginia, West Virginia, Wisconsin; Alberta, Nova Scotia.

Agrimonia mollis (T. & G.) Britton, *Arkansas, Nebraska, New Mexico, Virginia; Ontario.*

Agrimonia parviflora Sol., *Arkansas, Delaware,* Kentucky, Michigan, *Maryland, Mississippi,* North Carolina, Virginia, Tennessee.

Agrimonia pumila Muhl., Indiana, Kansas, Louisiana, Michigan.

107. **Pucciniastrum pustulatum.**

Chamaenerion angustifolium (L.) Scop., Alaska, Maine, New Mexico, *North Dakota, Oregon, West Virginia;* Alberta, British Columbia, Manitoba, Northwest Territory, Nova Scotia.

Epilobium adenocaulon Haussk., Alaska, Idaho, New York, *North Dakota,* Oregon, Pennsylvania, *South Dakota, Utah,* Virginia, *Washington,* West Virginia, Wisconsin, *Wyoming;* British Columbia.

Epilobium adenocaulon occidentale Trel., *Wyoming.*

Epilobium alpinum L., Alaska.

Epilobium anagallidifolium Lam., *Utah.*

Epilobium coloratum Muhl., Pennsylvania.

108. **Pucciniastrum Pyrolae.**

Chimaphila maculata (L.) Pursh, Delaware, Maryland.

Pyrola elliptica Nutt., Connecticut, Delaware, Iowa; Nova Scotia.

Pyrola secunda L., Montana.

Pucciniastrum sparsum.

Arbutus Menziesii Pursh, *Oregon, Washington.*

Arctostaphylos nevadensis A. Gray, Oregon.

Mairania alpina (L.) Desv., Alaska.

109. **Pucciniastrum minimum.**

Azalea nudiflora L., Connecticut.

Azalea sp., Delaware, *Georgia.*

Rhodora canadensis L., Nova Scotia.

Pucciniastrum Myrtilli.

Gaylussacia resinosa (Ait.) T. & G., *Connecticut,* Wisconsin; Quebec.

Vaccinium caespitosum Michx. (*V. caespitosum cuneifolium* Nutt.); Alaska, Montana, Oregon.

Vaccinium corymbosum L., *Delaware,* New York; Ontario.

Vaccinium globulare Rydb., *Montana.*

Vaccinium membranaceum Dougl., *Montana,* Oregon.

Vaccinium oreophilum Rydb., Montana, New Mexico.

110. **Melampsoridium Betulae.**

Betula glandulosa Michx., Idaho, Montana.

Betula lutea Michx., Ohio.

Betula populifolia Marsh., *Connecticut,* Maine, *New Hampshire,* New Jersey, New York.

111. **Melampsorella elatina.**
Abies balsamea (L.) Mill., Manitoba, *New Brunswick, Nova Scotia, Ontario.*
Abies lasiocarpa Nutt., Colorado, New Mexico, Oregon, *Washington;* British Columbia.
Cerastium occidentale Greene, Colorado.
Cerastium oreophilum Greene, South Dakota.
Cerastium vulgatum L., Oregon; Manitoba.

112. **Hyalopsora Aspidiotus.**
Phegopteris Dryopteris (L.) Fée, Idaho, Oregon, Washington; Ontario, Quebec.
Hyalopsora Polypodii.
Filix fragilis (L.) Underw., Alaska, California, Connecticut, Iowa, Michigan, Mississippi, *Nebraska,* Ohio, Oregon, Pennsylvania; British Columbia, Ontario.

113. **Hyalopsora laeviuscula.**
Polypodium Glycyrrhiza D. C. Eaton, Alaska, Oregon.
Hyalopsora Cheilanthis.
Cryptogramme Stelleri (Gmel.) Prantl, Montana.

114. **Calyptospora columnaris.**
Vaccinium canadense Rich., Wisconsin.
Vaccinium corymbosum L., Pennsylvania.
Vaccinium membranaceum Dougl., *Montana,* Oregon, Wyoming.
Vaccinium oreophilum Rydb., Montana, *Washington.*
Vaccinium ovatum Pursh, Oregon.
Vaccinium parvifolium J. E. Smith, Oregon.
Vaccinium pennsylvanicum Lam., *New Hampshire;* Nova Scotia.
Necium Farlowii.
Tsuga canadensis (L.) Carr., Connecticut, Wisconsin; Nova Scotia.

115. **Uredinopsis Osmundae.**
Osmunda cinnamomea L., *New Hampshire.*
Osmunda Claytoniana L., Connecticut, Indiana, Minnesota, Vermont; Nova Scotia.
Osmunda spectabilis Willd., New York; Nova Scotia.
Uredinopsis mirabilis.
Lorinseria areolata (L.) Presl, Maryland.
Onoclea sensibilis L., Delaware, Indiana, Michigan, *Nebraska, New Hampshire,* Virginia; Nova Scotia, Ontario, Quebec.

116. **Uredinopsis Copelandi.**
Athyrium cyclosorum Rupr., Idaho, Montana, Oregon, *Washington;* British Columbia.
Uredinopsis Struthiopteridis.
Anchistea virginica (L.) Presl, Connecticut, Indiana, *Massachusetts,* Michigan, *New York;* Bermuda.
Matteuccia Struthiopteris (L.) Todaro, Nova Scotia, Quebec.

117. **Uredinopsis Atkinsonii.**
Asplenium Filix-foemina (L.) Bernh., Connecticut, *New Hampshire,* New York, Vermont, Wisconsin; Quebec.
Dryopteris Thelypteris (L.) A. Gray, Connecticut, Indiana, Montana, *Nebraska,* North Dakota; Nova Scotia, *Ontario.*

118. **Melampsoropsis Empetri.**
Empetrum nigrum L., Maine; British Columbia.
Melampsoropsis Pyrolae.
Moneses uniflora (L.) A. Gray, Montana, New Mexico, Washington; Alberta.
Pyrola asarifolia Michx., Idaho, Montana, New Mexico; British Columbia.
Pyrola chlorantha Sw., Montana.

Pyrola elliptica Nutt., Connecticut.
Pyrola rotundifolia L., Massachusetts, New York; Nova Scotia.
Pyrola secunda L., Montana, New Mexico, New York, Oregon; Newfoundland, Quebec.
Pyrola uliginosa Torr., Colorado, Wisconsin; Nova Scotia.

119. **Melampsoropsis ledicola.**
Ledum groenlandicum Oeder, Wisconsin; Manitoba, Nova Scotia, Yukon.
Melampsoropsis Cassandrae.
Chamaedaphne calyculata (L.) Moench, Connecticut; Nova Scotia, *Ontario*.
Melampsoropsis abietina.
Ledum glandulosum Nutt., *California*, Idaho, *Montana*, Nevada.
Ledum groenlandicum Oeder, Connecticut, Michigan, New York; British Columbia, Nova Scotia, Ontario.

120. **Melampsoropsis Arctostaphyli.**
Arctostaphylos Uva-Ursi (L.) Spreng., *Colorado*, Alaska, Utah.
Melampsoropsis Piperiana.
Rhododendron californicum Hook., California.

121. **Melampsoropsis Chiogenis.**
Chiogenes hispidula (L.) T. & G., New York.
Cronartium Comptoniae.
Comptonia peregrina (L.) Coult., Michigan, *New Hampshire*, Pennsylvania, Virginia, *Wisconsin*.
Myrica Gale L., Alaska; British Columbia, Nova Scotia.

122. **Cronartium Quercus.**
Pinus divaricata (Ait.) Sudw., Connecticut, Wisconsin.
Pinus rigida Mill., Connecticut.
Pinus Taeda L., Alabama, Florida, Virginia.
Pinus virginiana Mill., Delaware, North Carolina, South Carolina, Virginia, Tennessee.
Quercus alba L., *Arkansas*, North Carolina.
Quercus digitata (Marsh.) Sudw., *Delaware*, *North Carolina*.
Quercus macrocarpa Michx., *Missouri*, Wisconsin.
Quercus marylandica Moench, Alabama, *Arkansas*, *Delaware*, Mississippi, Virginia.
Quercus minor (Marsh.) Sarg., Texas.
Quercus nigra L., Delaware.
Quercus Prinus L., Texas, Virginia.
Quercus rubra L., Virginia.
Quercus velutina Lam., Connecticut, *Maryland*, *Virginia*, *West Virginia*, Wisconsin.
Quercus virginiana Mill., Texas; Cuba.

123. **Cronartium Comandrae.**
Comandra pallida A. DC., Arizona, *Idaho*, Minnesota, *Missouri*, New Mexico, *North Dakota*, *Oregon*, Utah; Alberta, Northwest Territory.
Comandra umbellata (L.) Nutt., Colorado, Delaware, Indiana, Mississippi, *New Hampshire*, Oregon; Quebec.
Cronartium coleosporioides.
Castilleja miniata Dougl., *California*.

127. **Pucciniosira pallidula.**
Triumfetta Lappula L., Salvador.
Triumfetta semitriloba L., Guatemala; Cuba; Santo Domingo; Porto Rico.

132. **Ravenelia Ingae.**
Inga vera Willd., Santo Domingo.

133. **Ravenelia Pithecolobii.**
Pithecolobium Unguis-Cati (L.) Benth., Porto Rico.

135. **Ravenelia siliquae.**
Vachellia Farnesiana (L.) Wight & Arn., Texas; Guatemala; Cuba; Porto Rico.
Ravenelia Acaciae-pennatulae.
Acacia pennatula Benth., Guatemala.

136. **Ravenelia versatilis.**
Acacia Greggii A. Gray, New Mexico.
Ravenelia igualica.
Acacia filicioides (Cav.) Trel., Texas; Guatemala.

138. **Ravenelia Mimosae-albidae.**
Mimosa albida Humb. & Bonpl., Guatemala; Costa Rica.
Mimosa albida floribunda B. L. Robinson, Guatemala.
Ravenelia cassiaecola.
Chamaecrista multipinnata (Pollard) Greene, *Georgia.*

139. **Ravenelia indica.**
Cassia hispidula Vahl, Cuba.
Ravenelia portoricensis.
Cassia emarginata L., Cuba; Jamaica; Haïti; Santo Domingo.

140. **Ravenelia papillifera.**
Cassia Lindheimeriana Scheele, Chihuahua.

141. **Ravenelia Humphreyana.**
Poinciana pulcherrima L., Costa Rica; Porto Rico.

142. **Ravenelia epiphylla.**
Cracca virginiana L., Indiana, Kentucky, *Louisiana, Mississippi, Tennessee, Virginia.*

143. **Ravenelia caulicola.**
Cracca cinerea (L.) Morong, Santo Domingo; Porto Rico.
Ravenelia Brongniartiae.
Brongniartia podalyrioides H.B.K., *Jalisco.*

144. **Ravenelia Piscidiae.**
Ichthyomethia Piscipula (L.) A. S. Hitchc., Cuba.
Ravenelia Indigoferae.
Indigofera Anil L. (*I. suffruticosa* Mill.), Guatemala; Santo Domingo; Porto Rico.

147. **Pileolaria Toxicodendri.**
Rhus radicans L., *Arkansas*, Connecticut; District of Columbia, *Kentucky*, Michigan, Oklahoma, South Dakota, *Tennessee, Virginia;* Manitoba; Morelos.
Rhus Rydbergii Small, *Colorado, Kansas, Missouri, Montana, Nebraska, North Dakota*, Oklahoma, *South Dakota*, Texas, Washington.

151. **Tranzschelia punctata.**
Anemone caroliniana Walt., *Nebraska*, Texas.
Anemone quinquefolia L., Connecticut, Delaware, Michigan, New Jersey; Quebec.
Hepatica Hepatica (L.) Karst., Connecticut.
Thalictrum dioicum L., Indiana.
Thalictrum purpurascens L., *Colorado.*
Amygdalus Persica L., Oregon; Bermuda; Cuba.
Armeniaca vulgaris Lam., *Mississippi*, New Mexico.
Padus serotina (Ehrh.) Ag., *Arkansas*, Connecticut, *Georgia*, Indiana, Michigan, Nebraska, New York, West Virginia; *Oaxaca;* Guatemala.

Padus virginiana (L.) Roem., Connecticut, Missouri; *Ontario.*
Prunus americana Marsh., *Colorado,* Iowa, *Nebraska,* Texas.
Prunus Besseyi L. H. Bailey, *South Dakota.*
Prunus domestica L., Florida, Oregon.
Prunus hortulana L. H. Bailey, *Arkansas, Missouri.*
Prunus Watsoni Sarg., Texas.

152. **Polythelis fusca.**
Anemone quinquefolia L., California, Connecticut, Minnesota, Oregon, West Virginia.

153. **Polythelis Pulsatillae.**
Pulsatilla hirsutissima (Pursh) Britton, Alaska, *North Dakota;* Saskatchewan.

Polythelis Thalictri.
Thalictrum dioicum L., Michigan, Mississippi, New Jersey, *North Dakota.*
Thalictrum Fendleri Engelm., California, New Mexico.
Thalictrum polygamum Muhl., New Jersey; Nova Scotia.
Thalictrum sparsiflorum Turcz., *Utah,* Wyoming.
Thalictrum venulosum Trel., Montana.

155. **Uropyxis sanguinea.**
Mahonia Aquifolium (Pursh) Nutt., Oregon, Washington.

156. **Uropyxis Petalostemonis.**
Petalostemon candidus (Willd.) Michx., *Minnesota, North Dakota.*
Petalostemon purpureus (Vent.) Rydb., *Colorado.*

158. **Uropyxis Amorphae.**
Amorpha californica Nutt., *Arizona.*
Amorpha fruticosa L., *Colorado,* Missouri, New Mexico, Oklahoma, *Tennessee.*
Amorpha nana Nutt., *Kansas, New Mexico, North Dakota.*
Amorpha virgata Small, *Georgia.*

159. **Calliospora Holwayi.**
Eysenhardtia orthocarpa (A. Gray) S. Wats., Arizona.

160. **Prospodium appendiculatum.**
Stenolobium molle (H.B.K.) Seem., Guatemala.
Stenolobium Stans (L.) D. Don, Chihuahua, Jalisco, Puebla; Guatemala; Salvador; Nicaragua; Costa Rica; Panama; Bermuda; Jamaica; Santo Domingo; Porto Rico; St. Croix; Martinique; Barbados.

161. **Prospodium Lippiae.**
Lippia myriocephala Schlecht. & Cham., Costa Rica.

163. **Nephlyctis transformans.**
Stenolobium Stans (L.) D. Don, *Puebla;* Guatemala.

164. **Phragmidium Peckianum.**
Oreobatus deliciosus (James) Rydb., Arizona, Wyoming.

165. **Phragmidium imitans.**
Rubus leucodermis Dougl., Oregon.
Rubus strigosus Michx., California, Idaho, New Mexico, *North Dakota,* Utah, Wyoming; Labrador, Manitoba, Quebec.

166. **Phragmidium occidentale.**
Rubacer parviflorum (Nutt.) Rydb., Alaska, Arizona, Michigan, *Utah.*

167. **Phragmidium americanum.**
Rosa blanda Ait., New York, *Wisconsin.*
Rosa humilis Marsh., Massachusetts, Rhode Island.
Rosa virginiana Mill., New York.
Rosa sp., Michigan, North Dakota.

Phragmidium Rosae-setigerae.
Rosa carolina L., Connecticut, *Indiana*, Kansas, *Missouri*, Nebraska.

168. **Phragmidium Rosae-acicularis.**
Rosa acicularis Lindl., *Montana*; Manitoba.
Rosa heliophila Greene, Alberta, *Ontario*.
Rosa nutkana Presl, Oregon; Northwest Territory.
Rosa Sayi Schw., Montana, Wisconsin.

169. **Phragmidium montivagum.**
Rosa aciculata (Cockerell) Rydb., Utah.
Rosa Engelmanni S. Wats., Arizona, Idaho, Montana, Utah.
Rosa Fendleri Crépin, *Arizona*, New Mexico, *Utah*, Washington, *Wyoming*.
Rosa grosse-serrata E. Nels., Idaho.
Rosa gymnocarpa Nutt., Oregon.
Rosa Macounii Greene, Nevada, *South Dakota*.
Rosa Maximiliani Nees, New Mexico, *North Dakota*.

170. **Phragmidium Rosae-californicae.**
Rosa californica Cham. & Schlecht., Nevada; British Columbia.
Rosa gymnocarpa Nutt., British Columbia.
Rosa nutkana Presl, Alaska, *Oregon*.
Rosa pisocarpa A. Gray, California, Oregon.
Phragmidium Rosae-arkansanae.
Rosa Fendleri Crépin, Montana.
Rosa heliophila Greene, *North Dakota;* Alberta.
Rosa Maximiliani Nees, Montana, North Dakota, Wisconsin.

171. **Phragmidium disciflorum.**
Rosa alba L., *New York*.
Rosa gallica L., Idaho, North Dakota.
Rosa sp., Florida, Indiana, Montana, Oregon, Washington; British Columbia, Ontario, Quebec; Jalisco; Guatemala.

172. **Phragmidium subcorticinum.**
Rosa spinosissima L., Wisconsin.

173. **Phragmidium Andersoni.**
Dasiphora fruticosa (L.) Rydb., *Idaho*, Minnesota, Montana, New Mexico, *North Dakota*, *South Dakota*, Wisconsin.

174. **Phragmidium Ivesiae.**
Potentilla Bakeri Rydb., Idaho.
Potentilla Blaschkeana Turcz., Oregon.
Potentilla filipes Rydb., Oregon.
Potentilla flabelliformis Lehm., Montana, Wyoming; Alberta.
Potentilla glomerata A. Nels., Alberta.
Potentilla Hippiana Lehm., Montana.
Potentilla monspeliensis L., Montana.
Potentilla Nuttallii Lehm., Idaho, Washington.
Potentilla pulcherrima Lehm., *Colorado*, Montana.
Phragmidium Potentillae.
Potentilla arachnoidea Dougl., Oregon.
Potentilla bipinnatifida Dougl., Alberta, Northwest Territory.
Potentilla monspeliensis L., Connecticut, Pennsylvania.
Potentilla pectinata Raf., New Hampshire.
Potentilla pennsylvanica L., *Montana*, *Nebraska*, *North Dakota*.
Potentilla strigosa Pall., *Wyoming*.

175. **Earlea speciosa.**
Rosa carolina L., Connecticut, Mississippi, Pennsylvania.
Rosa humilis Marsh., North Carolina.
Rosa Maximiliani Nees, *Colorado, Montana.*
Rosa virginiana Mill., Indiana, Massachusetts, Missouri, New York.

179. **Ameris rosicola.**
Rosa Engelmanni S. Wats., Montana.
Nyssopsora echinata.
Ligusticum purpureum Coult. & Rose, Oregon.

180. **Nyssopsora clavellosa.**
Aralia nudicaulis L., Idaho.
Gymnoconia interstitialis.
Rubus allegheniensis Porter, Michigan; Ontario.
Rubus occidentalis L., Indiana, *Michigan*, South Dakota; New Brunswick, *Ontario.*
Rubus sp. (cult.), *Missouri.*

184. **Spirechina Rubi.**
Rubus adenotrichos Schlecht., Salvador.

185. **Kuehneola obtusa.**
Potentilla canadensis L., Alabama, *Arkansas*, Delaware, Louisiana, Maryland, Mississippi, New Hampshire, *New Jersey*, Tennessee.
Kuehneola Duchesneae.
Duchesnea indica (Andr.) Focke, Kentucky, Maryland, New York, Tennessee, Virginia.

186. **Kuehneola Uredinis.**
Rubus allegheniensis Porter, Connecticut, *Kentucky*, Michigan, *Missouri*, Rhode Island, South Carolina, *Tennessee*, Virginia, *Wisconsin.*
Rubus Andrewsianus Blanch., New York.
Rubus canadensis L., New York, Virginia.
Rubus hispidus L., Indiana, Wisconsin.
Rubus trivialis Michx., Florida.
Rubus villosus Ait., *Illinois*, Mississippi, New York; Ontario.

187. **Kuehneola malvicola.**
Hibiscus Syriacus L., *Alabama*, Mississippi.
Malvaviscus arboreus Cav., Costa Rica; Cuba.

191. **Gymnosporangium inconspicuum.**
Juniperus utahensis (Engelm.) Lemm., Utah.

192. **Gymnosporangium Harknessianum.**
Amelanchier alnifolia Nutt., Oregon.
Gymnosporangium multiporum.
Juniperus monosperma (Engelm.) Sarg., *New Mexico.*

193. **Gymnosporangium Davisii.**
Aronia nigra (Willd.) Britton, *New Hampshire.*
Gymnosporangium juvenescens.
Amelanchier alnifolia Nutt., Idaho, *North Dakota*, Oregon, Utah, Washington; Saskatchewan.
Amelanchier florida Lindl., Utah.
Amelanchier oreophila A. Nels., Idaho.
Amelanchier polycarpa Greene, Utah.
Amelanchier pumila Nutt., Colorado.
Juniperus scopulorum Sarg., Arizona, Idaho, *Montana*, *New Mexico*, Oregon, Utah, Wyoming.

194. **Gymnosporangium Kernianum.**
Juniperus utahensis (Engelm.) Lemm., *Idaho*, Nevada.
Gymnosporangium trachysorum.
Juniperus virginiana L., Louisiana.

195. **Gymnosporangium tubulatum.**
Crataegus Douglasii Lindl., *Idaho*, Oregon, Washington, *Wyoming.*
Gymnosporangium Botryapites.
Amelanchier canadensis (L.) Medic., *New York.*
Chamaecyparis thyoides (L.) B.S.P., Rhode Island.

196. **Gymnosporangium Nidus-avis.**
Amelanchier canadensis (L.) Medic., New Jersey, New York, *Pennsylvania.*
Juniperus virginiana L., Missouri, Nebraska, New York.

197. **Gymnosporangium germinale.**
Amelanchier canadensis (L.) Medic., Indiana, *Massachusetts*, Michigan; Nova Scotia.
Amelanchier intermedia Spach, New Jersey.
Amelanchier rotundifolia (Michx.) Roem., Maine.
Crataegus Crus-galli L., Texas.
Crataegus mollis (T. & G.) Scheele, Michigan.
Crataegus punctata Jacq., Michigan, Missouri, West Virginia.
Crataegus spathulata Michx., Georgia, Virginia.
Cydonia vulgaris (L.) Pers., Indiana.
Malus Malus (L.) Britton, Connecticut.
Juniperus communis L., Michigan.
Juniperus sibirica Burgsd., Wyoming.
Juniperus virginiana L., Arkansas, Florida, Indiana, Louisiana, Texas; Ontario.

198. **Gymnosporangium cornutum.**
Sorbus americana Marsh., Connecticut; *New Brunswick.*
Sorbus scopulina Greene, Michigan, *Montana.*

199. **Gymnosporangium exterum.**
Porteranthus stipulatus (Muhl.) Britton, Indiana.
Gymnosporangium juniperinum.
Sorbus occidentalis (S. Wats.) Greene, Oregon, Washington; Alberta.
Sorbus sitchensis Roem., Alaska, Washington.
Juniperus sibirica Burgsd., Oregon, Utah, Washington, Wyoming.

200. **Gymnosporangium gracilens.**
Fendlera rupicola Engelm. & Gray, Arizona, Colorado.
Philadelphus microphyllus A. Gray, New Mexico.
Philadelphus occidentalis A. Nelson, *Utah.*

201. **Gymnosporangium effusum.**
Juniperus virginiana L., Virginia.
Gymnosporangium japonicum.
Juniperus chinensis L., New Jersey, Washington.

202. **Gymnosporangium transformans.**
Aronia arbutifolia (L.) Ell., Delaware.
Gymnosporangium clavariaeforme.
Amelanchier alnifolia Nutt., Montana, South Dakota, Utah, Wyoming.
Amelanchier canadensis (L.) Medic., Indiana, Michigan; Nova Scotia.
Amelanchier oblongifolia (T. & G.) Roem., Maine.
Amelanchier pumila Nutt., *Utah.*
Juniperus communis L., *Michigan*, Montana, Pennsylvania.
Juniperus sibirica Burgsd., Montana.

204. **Gymnosporangium Betheli.**
Crataegus coloradensis A. Nelson, South Dakota.
Crataegus Douglasii Lindl., Idaho, Utah; British Columbia.
Crataegus erythropoda Ashe, New Mexico.
Crataegus rivularis Nutt., *Utah.*
Juniperus scopulorum Sarg., Idaho, *New Mexico, North Dakota,* Utah, Washington.
Gymnosporangium globosum.
Crataegus anomala Sarg., New York.
Crataegus coccinea L., *Pennsylvania,* South Dakota; *Ontario.*
Crataegus Crus-galli L., *Ohio.*
Crataegus polita Tatnalliana (Sarg.) Eggl. (cult.), New York.
Crataegus rotundifolia Moench, Missouri, New York.
Crataegus tomentosa L., *Kentucky.*
Malus Malus (L.) Britton, Missouri, New Jersey.
Pyrus communis L., Pennsylvania.
Sorbus americana Marsh., New York.
Juniperus virginiana L., Oklahoma.

206. **Gymnosporangium hyalinum.**
Crataegus viridis L., North Carolina.

207. **Gymnosporangium Nelsoni.**
Amelanchier alnifolia Nutt., *Montana, Nebraska, New Mexico; Alberta,* British Columbia.
Amelanchier oreophila A. Nels., New Mexico.
Cydonia vulgaris (L.) Pers., Arizona.
Peraphyllum ramosissimum Nutt., Utah.
Pyrus communis L., *Arizona.*
Sorbus occidentalis (S. Wats.) Greene, Washington.
Juniperus monosperma (Engelm.) Sarg., Arizona.
Juniperus scopulorum Sarg., Idaho, *New Mexico, North Dakota,* Oregon.

208. **Gymnosporangium corniculans.**
Juniperus horizontalis Moench, Saskatchewan.
Gymnosporangium floriforme.
Crataegus spathulata Michx., Mississippi.
Juniperus virginiana L., Arkansas, Oklahoma.

209. **Gymnosporangium Juniperi-virginianae.**
Malus baccata (L.) Desf., Connecticut, Missouri, Nebraska, Virginia.
Malus coronaria (L.) Mill., Missouri, Virginia.
Malus ioensis (Wood) Britton, Mississippi, *North Dakota.*
Malus Malus (L.) Britton, Missouri.
Juniperus virginiana L., Louisiana, Rhode Island.

222. **Nigredo Sparganii.**
Sparganium eurycarpum Engelm., Michigan; Quebec.

223. **Nigredo pedatata.**
Viola primulaefolia L., Pennsylvania, West Virginia.
Viola sagittata L., West Virginia.
Andropogon virginicus L., Indiana, *Missouri,* New York, *Virginia.*

224. **Nigredo Clignyi.**
Andropogon hirtiflorus Kunth, Guatemala.
Nigredo graminicola.
Panicum virgatum L., Connecticut, Delaware, Indiana, New Mexico, New York, *Wisconsin.*

Nigredo leptoderma.
Panicum barbinode Trin., Salvador; Panama; Santo Domingo; Porto Rico; St. Croix.

225. **Nigredo seditiosa.**
Plantago aristata Michx., Indiana.
Plantago eriopoda Torr., *Nebraska*, North Dakota, Washington; Alberta.
Plantago Purshii R. & S., Oklahoma.
Plantago virginica L., Oklahoma.
Aristida basiramea Engelm., Oklahoma, Texas.
Aristida dichotoma Michx., Alabama, Texas.
Aristida oligantha Michx., Illinois, Indiana, *Louisiana*, Missouri, Nebraska, Oklahoma, *Tennessee.*
Aristida purpurascens Poir., Texas, Virginia.
Aristida purpurea Nutt., *Missouri.*

226. **Nigredo Halstedii.**
Homalocenchrus oryzoides (L.) Poll., Texas, *Wisconsin.*
Homalocenchrus virginicus (Willd.) Britton, Maryland.

227. **Nigredo Sporoboli.**
Sporobolus asper (Michx.) Kunth, South Dakota.

Nigredo Eragrostidis.
Eragrostis limbata Fourn., Guatemala; Costa Rica.
Eragrostis neo-mexicana Vasey, Jalisco.
Eragrostis pectinacea (Michx.) Steud., Delaware, New Jersey, Oklahoma.
Eragrostis tephrosanthus Schult., Cuba.

Nigredo Alopecuri.
Alopecurus aristulatus Michx., Saskatchewan.

228. **Nigredo Hordei.**
Hordeum pusillum Nutt., Arkansas, Indiana, *Missouri*, Oklahoma.

Nigredo mystica.
Hordeum jubatum L., *Idaho*, New Mexico.

229. **Nigredo Epicampis.**
Epicampes macroura (H.B.K.) Benth., Guatemala.

230. **Nigredo Peckiana.**
Atriplex patula L., California, Washington; British Columbia.
Distichlis spicata (L.) Greene, Connecticut; *British Columbia.*

231. **Nigredo Polemonii.**
Steironema ciliatum (L.) Raf., Connecticut, New York, Wisconsin.
Phlox divaricata L., Minnesota.
Phlox pilosa L., Iowa.
Polemonium reptans L., Wisconsin.
Spartina glabra alterniflora (Loisel.) Merr., Connecticut.
Spartina gracilis Trin., Montana.
Spartina Michauxiana Hitchc., Minnesota, *Montana*, New York; Manitoba.

232. **Nigredo Eleocharidis.**
Eleocharis palustris (L.) R. & S., Minnesota.

Nigredo Rhyncosporae.
Rynchospora distans (Michx.) Vahl, Porto Rico.
Rynchospora fascicularis (Michx.) Vahl, Cuba.
Rynchospora glomerata (L.) Vahl, *Arkansas*, Connecticut, District of Columbia, *Georgia*, Indiana, *Mississippi.*

233. **Nigredo Scirpi.**
Cicuta maculata L., District of Columbia.
Scirpus americanus Pers., Indiana, Texas, Wisconsin; Bermuda.
Scirpus fluviatilis (Torr.) A. Gray, Indiana; Quebec.
Scirpus pacificus Britton, Washington.
Scirpus paludosus A. Nelson, *California*, Maine, Oregon, *Wyoming*.
Scirpus robustus Pursh, *Massachusetts*.
Scirpus validus Vahl, Indiana.

234. **Nigredo minuta.**
Carex virescens Muhl., New York.
Nigredo valens.
Carex lupulina Muhl., Wisconsin.

235. **Nigredo perigynia.**
Carex flava L., New York.
Carex intumescens Rudge, New York.
Carex Novae-Angliae Schw., Maine.
Carex tribuloides Wahl., Delaware, Indiana, Michigan, Virginia.
Nigredo uniporula.
Carex gracillima Schw., Michigan.
Carex tenuis Rudge, North Carolina.

236. **Nigredo Caladii.**
Arisaema triphyllum (L.) Schott., Michigan, *North Dakota*, Tennessee, Virginia; Quebec.
Muricauda Dracontium (L.) Small, Delaware, Oklahoma.
Peltandra glauca (Ell.) Feay, New York.
Peltandra virginica (L.) Kunth, Connecticut, Michigan.

237. **Nigredo Commelinae.**
Commelina angustifolia Michx., Texas; Cuba.
Commelina elegans H.B.K., Porto Rico; St. Thomas.

238. **Nigredo Junci.**
Ambrosia psilostachya DC., *California*.
Arnica cordifolia Hook., Oregon.
Cirsium Flodmanii (Rydb.) Arth., Montana, Nebraska; Manitoba.
Juncus balticus Willd., Nevada, *Oregon*, Pennsylvania; Manitoba, Saskatchewan.
Juncus Lescurii Boland., Oregon.
Juncus mexicanus Willd., Nevada, New Mexico.

239. **Nigredo Silphii.**
Silphium perfoliatum L., Missouri.
Silphium terebinthinaceum Jacq., Michigan.
Juncus Dudleyi Wiegand, *Connecticut*, Michigan, Pennsylvania, *Tennessee*, Wyoming.
Juncus longistylis Torr., New Mexico, North Dakota.
Juncus tenuis Willd., Connecticut, *Illinois*, Maryland, *Ohio*, Pennsylvania, Tennessee, Vermont.
Nigredo Junci-effusi.
Juncus effusus L., Alabama, Connecticut, Indiana, Virginia.
Juncus ensifolius Wikstr., Idaho, Utah.

240. **Nigredo Zygadeni.**
Toxicoscordion Nuttallii (A. Gray) Rydb., Texas.
Toxicoscordion paniculatum (Nutt.) Rydb., Nevada.

241. **Nigredo aemula.**
Allium acuminatum Hook., Colorado.
Allium validum S. Wats., Oregon.

242. **Nigredo Lilii.**

Lilium canadense L., Michigan.
Lilium candidum L., *Massachusetts.*
Lilium columbianum Hanson, Idaho, Oregon.
Lilium superbum L., Connecticut.
Lilium umbellatum Pursh, Idaho.

Nigredo houstoniata.

Houstonia caerulea L., Indiana, Maine, *New York.*

243. **Nigredo proba.**

Olsynium grandiflorum (Dougl.) Raf., Utah.

Nigredo Polygoni.

Polygonum aviculare L., Alaska, Idaho, *Missouri, New Hampshire,* Oregon, Pennsylvania, Rhode Island, Wyoming; Quebec.
Polygonum erectum L., *California; Ontario.*
Polygonum maritimum L., *Massachusetts.*

244. **Nigredo intricata.**

Eriogonum campanulatum Nutt., *Wyoming.*
Eriogonum compositum Dougl., Oregon.
Eriogonum croceum Small, Oregon.
Eriogonum fasciculatum Benth., Arizona.
Eriogonum flavum Nutt., North Dakota.
Eriogonum heracleoides Nutt., Wyoming.
Eriogonum microthecum Nutt., Oregon, Utah.
Eriogonum multiceps Nees, *Montana, North Dakota.*
Eriogonum racemosum Nutt., New Mexico, Utah.
Eriogonum subalpinum Greene, California.
Eriogonum umbellatum Torr., *California.*
Eriogonum virgatum Benth., *Colorado,* Wyoming.

246. **Nigredo caryophyllina.**

Dianthus Caryophyllus L., Alaska, California, Connecticut, Delaware, *Missouri,* Mississippi, New Jersey, Oklahoma, Oregon, Washington; Quebec; Cuba.

247. **Nigredo Silenes.**

Silene Douglasii multicaulis (Nutt.) B. L. Robinson, Montana.

Nigredo Lespedezae-procumbentis.

Lespedeza angustifolia (Pursh) Ell., Minnesota.
Lespedeza capitata Michx., Michigan.
Lespedeza frutescens (L.) Britton, *Georgia,* Indiana, Missouri, *South Carolina, Virginia.*
Lespedeza hirta (L.) Hornem., *Arkansas,* Kentucky, *Michigan, Mississippi, New Jersey, North Carolina,* Texas, Virginia.
Lespedeza procumbens Michx., *Georgia,* Maryland, Mississippi, Pennsylvania, Texas, Virginia.
Lespedeza repens (L.) Bart., *North Carolina.*
Lespedeza violacea (L.) Pers., Arkansas, Connecticut, Massachusetts, Pennsylvania, Virginia.
Lespedeza virginica (L.) Britton, Georgia, *Louisiana,* Maryland, New York, Texas, Virginia.

248. **Nigredo Hedysari-paniculati.**

Meibomia bracteosa (Michx.) Kuntze, South Carolina.
Meibomia canadensis (L.) Kuntze, Kentucky, Michigan, Mississippi.
Meibomia canescens (L.) Kuntze, *Arkansas, Georgia, Kentucky, Louisiana,* Tennessee.
Meibomia Dillenii (Darl.) Kuntze, *Georgia,* Illinois, New York, Tennessee, Virginia, *West Virginia.*

Meibomia laevigata (Nutt.) Kuntze, *Kentucky.*
Meibomia marilandica (L.) Kuntze, *Michigan, Mississippi,* New York, *Tennessee,* Texas.
Meibomia Michauxii Vail, Indiana, South Carolina, *Vermont,* Virginia.
Meibomia obtusa (Muhl.) Vail, Delaware, New York, *Texas.*
Meibomia paniculata (L.) Kuntze, District of Columbia, *Georgia, Louisiana, Maryland,* Massachusetts, *Oklahoma,* Virginia.
Meibomia pauciflora (Nutt.) Kuntze, Missouri.
Meibomia rigida (Ell.) Kuntze, *Massachusetts,* Missouri.
Meibomia sessilifolia (Torr.) Kuntze, Oklahoma, Texas.
Meibomia stricta (Pursh) Kuntze, Delaware.
Meibomia viridiflora (L.) Kuntze, Kentucky, *Missouri, New Jersey.*

250. **Nigredo Indigoferae.**
Indigofera mucronata Spreng., Salvador; Costa Rica.

251. **Nigredo Fabae.**
Lathyrus arizonicus Britton, Arizona, New Mexico.
Lathyrus decaphyllus Pursh, New Mexico.
Lathyrus leucanthus Rydb., Idaho.
Lathyrus ochroleucus Hook., Michigan, *South Dakota;* Alberta, Manitoba.
Lathyrus pauciflorus Fernald, Oregon.
Lathyrus sulphureus Brewer, California, Oregon.
Lathyrus utahensis M. E. Jones, *Colorado.*
Lathyrus venosus Muhl., *North Dakota.*
Vicia americana Muhl., Arizona, Idaho, Missouri, New Mexico, Oregon; British Columbia, Northwest Territory, Saskatchewan.
Vicia Cracca L., *Connecticut;* Quebec.
Vicia Faba L., California; Guatemala.
Vicia linearis (Nutt.) Greene, Arizona, Minnesota, Oregon, Wyoming.

252. **Nigredo Lupini.**
Lupinus argenteus Pursh, Wyoming.
Lupinus laxiflorus Dougl., Oregon.
Lupinus polyphyllus Lindl., Oregon.
Lupinus rivularis Dougl., Oregon.

Nigredo occidentalis.
Lupinus Kingii S. Wats., New Mexico.

253. **Nigredo substriata.**
Lupinus argenteus Pursh, *Wyoming.*
Lupinus laxiflorus Dougl., Montana.

Nigredo punctata.
Aragallus albiflorus A. Nels., *Wyoming.*
Aragallus Lamberti (Pursh) Greene, *North Dakota, Wyoming.*
Aragallus sericeus (Nutt.) Greene, Wyoming.
Astragalus Bigelovii A. Gray, New Mexico.
Astragalus canadensis L., Minnesota, Wisconsin.
Astragalus crassicarpus Nutt., Minnesota.
Astragalus glareosus Dougl., *Utah,* Washington.
Astragalus mollissimus Torr., *Wyoming.*
Astragalus nitidus Dougl., Colorado, *North Dakota.*
Astragalus Purshii Dougl., Montana, Oregon.

254. **Nigredo fallens.**
Trifolium medium L., New York.
Trifolium pratense L., California, Connecticut, District of Columbia, Idaho, Michigan, *Montana, New Hampshire, New Jersey, North Dakota,* Oklahoma, *Oregon, Rhode Island,* Utah, *Vermont,* Virginia, *Wisconsin, Wyoming;* Ontario.

255. **Nigredo Trifolii.**

Trifolium amabile H.B.K., Guatemala.

Trifolium hybridum L., *Delaware*, Maryland, *Montana*, *Nebraska*, New Hampshire, New Jersey, Oregon, *Pennsylvania*, Rhode Island, *Virginia*, *Wisconsin; Ontario.*

Trifolium repens L., *California*, Idaho, Michigan, Missouri, New Hampshire, New Jersey, Oregon, Rhode Island, Virginia, *Washington;* Ontario.

256. **Nigredo Cologaniae.**

Cologania pulchella H.B.K., Costa Rica.

Nigredo Medicaginis.

Medicago denticulata Willd., Hidalgo; Bermuda.

Medicago lupulina L., Kentucky, Pennsylvania; Hidalgo.

Medicago sativa L., *California*, Kentucky, Mississippi, New Mexico, Oklahoma, Pennsylvania, Tennessee, Utah; Cuba.

257. **Nigredo appendiculata.**

Dolichos Lablab L., Cuba; Porto Rico.

Phaseolus lunatus L., California; Guatemala.

Phaseolus vulgaris L., California, *Colorado*, Connecticut, *Kentucky*, *Missouri*, *New Hampshire*, New Mexico, Pennsylvania, *Tennessee*, Virginia; *Ontario;* Salvador; Panama; Haïti.

Strophostyles helvola (L.) Britton, *Arkansas*, Connecticut, Tennessee.

Strophostyles pauciflora (Benth.) S. Wats., New Mexico, *Oklahoma*, *South Dakota*, Texas.

Vigna repens (L.) Kuntze, Cuba; Santo Domingo; Porto Rico.

Vigna sinensis (L.) Endl., Alabama, Missouri, Virginia.

259. **Nigredo proëminens.**

Adenopetalum gramineum (Jacq.) Arth., Guatemala.

Chamaesyce albomarginata (T. & G.) Small, Arizona, New Mexico, Texas.

Chamaesyce brasiliensis (Lam.) Small, Santo Domingo; Porto Rico.

Chamaesyce Fendleri (T. & G.) Small, *Colorado.*

Chamaesyce Geyeri (Engelm.) Small, *Kansas*, *Wyoming.*

Chamaesyce glyptosperma (Engelm.) Small, New Mexico.

Chamaesyce hirsuta (Torr.) Arth., *Ontario.*

Chamaesyce hirta (L.) Millsp., Arizona; Guatemala; Salvador; Panama; Cuba; Santo Domingo.

Chamaesyce humistrata (Engelm.) Small, Kansas, *Kentucky*, Michigan, Oklahoma, Pennsylvania, *Tennessee; Ontario.*

Chamaesyce hypericifolia (L.) Millsp., Santo Domingo.

Chamaesyce lata (Engelm.) Small, Colorado.

Chamaesyce maculata (L.) Small, *Colorado*, Michigan, New York, Pennsylvania, Virginia, West Virginia.

Chamaesyce petaloidea (Engelm.) Small, *Colorado.*

Chamaesyce Preslii (Guss.) Arth., *Alabama*, District of Columbia, *Kentucky*, *Michigan*, *Oklahoma*, Tennessee, *Virginia*, West Virginia, *Wisconsin;* Salvador.

Chamaesyce prostrata (Ait.) Small, Texas; Haïti; Santo Domingo; Porto Rico.

Chamaesyce serpens (H.B.K.) Small, Panama; Porto Rico.

Chamaesyce serpyllifolia (Pers.) Small, Mississippi.

Dichrophyllum marginatum (Pursh) Klotzsch & Garcke, Oklahoma.

Poinsettia dentata (Michx.) Small, New Mexico, Oklahoma, Virginia.

Poinsettia heterophylla (L.) Klotzsch & Garcke, Florida, Illinois, Mississippi, Missouri, Texas; Salvador; Porto Rico.

261. **Nigredo Hyperici-frondosi.**

Ascyrum hypericoides L., New Jersey, Texas.

Hypericum ellipticum Hook., *Maryland*, *New Hampshire.*

Hypericum majus (A. Gray) Britton, Maryland, *New Hampshire*, Pennsylvania Wisconsin.
Hypericum mutilum L., *New Hampshire*.
Hypericum prolificum L., Indiana, Pennsylvania, Texas.
Triadenum virginicum (L.) Raf., Delaware, *Nebraska*.

262. **Nigredo plumbaria.**
Gaura biennis L., Illinois, *Maryland*, Texas, Virginia, Wisconsin.
Gaura coccinea Pursh, *Nevada*, *New Mexico*, North Dakota, *Wyoming;* Saskatchewan.
Gaura sinuata Nutt., Oklahoma.
Oenothera laciniata Hill, *Kansas*, New Jersey, Oklahoma, Texas.
Onagra biennis (L.) Scop., Delaware, Missouri, Oklahoma, Texas.
Pachylophus macroglottis Rydb., Colorado.
Pachylophus montanus (Nutt.) A. Nels., Idaho, Montana, Utah.

264. **Nigredo Gentianae.**
Amarella strictiflora (Rydb.) Greene, New Mexico, *Wyoming*.
Nigredo Howei.
Asclepias Curassavica L., Florida; Guatemala; Cuba.
Asclepias incarnata L., Connecticut, Virginia.
Asclepias phytolaccoides Pursh, Virginia.
Asclepias pulchra Ehrh., Virginia.
Asclepias syriaca L., Connecticut, Minnesota, Mississippi, Tennessee.
Asclepiodora decumbens (Nutt.) A. Gray, New Mexico.
Ibatia muricata (L.) Decaisne, Porto Rico.

265. **Nigredo Ruelliae.**
Beloperone californica Benth., Nevada.

266. **Nigredo Spermacoces.**
Diodia teres Walt., *Alabama*, Indiana, Maryland, *Oklahoma*.

267. **Nigredo Helleriana.**
Cayaponia racemosa (Sw.) Cogn., Salvador; Cuba.

277. **Dicaeoma Sorghi.**
Xanthoxalis stricta (L.) Small, Michigan.
Euchlaena mexicana Schrad., Nebraska.
Zea Mays L., *Georgia*, *Tennessee;* Costa Rica; Santo Domingo; Porto Rico.

278. **Dicaeoma pallescens.**
Zea Mays L., Santo Domingo.

279. **Dicaeoma polysorum.**
Tripsacum latifolium Hitchc., Virginia.
Dicaeoma Ceanothi.
Andropogon Hallii Hack., New Mexico.
Tripsacum dactyloides L., Texas.

280. **Dicaeoma virgatum.**
Sorghastrum nutans (L.) Nash, Tennessee.
Dicaeoma Mariae-Wilsoni.
Viola Nuttallii Pursh, South Dakota, Wyoming.

281. **Dicaeoma Andropogonis.**
Aureolaria flava (L.) Farwell, Connecticut.
Aureolaria virginica (L.) Pennell, Tennessee.
Castilleja sessiliflora Pursh, Kansas.
Penstemon grandiflorus Nutt., North Dakota.
Penstemon hirsutus (L.) Willd., Georgia.
Andropogon scoparius Michx., Connecticut, *Georgia*, *Minnesota*, *Mississippi*, New Mexico, *North Carolina*, Rhode Island.

283. **Dicaeoma Kaernbachii.**
Andropogon condensatus H.B.K., Veracruz; Grenada.

284. **Dicaeoma purpureum.**
Holcus halepensis L., Santo Domingo; Porto Rico.
Holcus Sorghum L., *Louisiana;* Haïti.

286. **Dicaeoma leve.**
Paspalum fimbriatum H.B.K., St. Croix.

287. **Dicaeoma Huberi.**
Panicum fasciculatum Sw., Panama.
Dicaeoma macrum.
Paspalum candidum (Humb. & Bonpl.) Kunth, Costa Rica.

288. **Dicaeoma tubulosum.**
Axonopus compressus (Sw.) Beauv., Louisiana.
Paspalum conjugatum Berg., Florida.
Paspalum paniculatum L., Panama.
Syntherisma digitata (Sw.) Hitchc., Costa Rica.
Syntherisma sanguinalis (L.) Dulac, California; Santo Domingo.
Valota insularis (L.) Chase, Santo Domingo.

289. **Dicaeoma substriatum.**
Paspalum floridanum Michx., *Oklahoma.*

290. **Dicaeoma impositum.**
Leptoloma cognatum (Schultes) Chase, New Mexico.
Dicaeoma emaculatum.
Panicum capillare L., Connecticut, Massachusetts, *New Hampshire.*

291. **Dicaeoma Pammelii.**
Panicum virgatum L., Connecticut, *Oklahoma.*

292. **Dicaeoma eslavense.**
Valota insularis (L.) Chase, Porto Rico; St. Thomas.
Dicaeoma flaccidum.
Echinochloa Crus-galli (L.) Beauv., Wisconsin.

294. **Dicaeoma Cenchri.**
Cenchrus echinatus L., Santo Domingo; St. Croix.
Cenchrus viridis Spreng., Santo Domingo.

295. **Dicaeoma poculiforme.**
Berberis canadensis Mill., Indiana.
Berberis vulgaris L., Connecticut; Saskatchewan.
Agropyron repens (L.) Beauv., Connecticut, New Hampshire.
Agrostis alba L., Mississippi.
Agrostis hyemalis (Walt.) B.S.P., Connecticut.
Agrostis perennans (Walt.) Tuckerm., Massachusetts, Pennsylvania.
Alopecurus aristulatus Michx., California.
Avena fatua glabrata Peterm., Washington.
Avena sativa L., Arizona, Connecticut, Kentucky, Pennsylvania, Washington.
Bromus secalinus L., Illinois.
Calamagrostis canadensis (Michx.) Beauv., Connecticut.
Cinna arundinacea L., Nebraska.
Dactylis glomerata L., Colorado, Connecticut, Pennsylvania.
Elymus condensatus Presl, Idaho.
Elymus glaucus Buckl., Utah.
Elymus virginicus L., Indiana, Wisconsin.

Festuca pacifica Piper, California.
Hordeum jubatum L., Kentucky.
Hordeum vulgare L., Alberta.
Koeleria cristata (L.) Pers., California.
Phleum pratense L., Connecticut, Idaho, Oklahoma, Utah.
Sporobolus cryptandrus (Torr.) A. Gray, South Dakota.
Triticum aestivum L., Virginia; Alberta.

298. **Dicaeoma Majanthae.**
Polygonatum biflorum (Walt.) Ell., Connecticut, New York.
Uvularia sessilifolia L., Mississippi.
Vagnera racemosa (L.) Morong, Connecticut, New York.
Vagnera sessilifolia (Baker) Greene, California.
Vagnera stellata (L.) Morong, Connecticut, South Dakota.

299. **[Allodus] interveniens** (see page 797).
Phymosia rivularis (Dougl.) Rydb., Idaho.
Sidalcea neo-mexicana A. Gray, Wyoming.

300. **Dicaeoma Stipae.**
Lygodesmia juncea (Pursh) D. Don, Saskatchewan.
Chrysopsis villosa (Pursh) Nutt., Wyoming.
Chrysothamnus graveolens (Nutt.) Greene, Washington.
Solidago glaberrima Martens, Alberta.
Stipa comata Trin. & Rupr., Alberta.

302. **Dicaeoma scaber.**
Stipa Lettermani Vasey, Utah.
Stipa Vaseyi Scribn., *South Dakota.*
Stipa viridula Trin., Alberta.
Dicaeoma micranthum.
Grossularia leptantha (A. Gray) Cov. & Britt., Utah.

303. **Dicaeoma verbenicola.**
Verbena hastata L., Indiana.
Sporobolus asper (Michx.) Kunth, Missouri.

304. **Dicaeoma simulans.**
Sporobolus cryptandrus (Torr.) A. Gray, Arizona.

305. **Dicaeoma Sarcobati.**
Triglochin maritima L., Alberta.
Atriplex rosea L., Nevada.
Chenopodium album L., Alberta.
Monolepis Nuttalliana (Schultes) Engelm., *Nevada.*
Salsola Pestifer A. Nelson, Nevada.
Sarcobatus vermiculatus (Hook.) Torr., *California.*
Bursa Bursa-pastoris (L.) Britton, *Nevada,* Utah.
Lepidium perfoliatum L., Nevada.
Sophia intermedia Rydb., Utah.
Gilia inconspicua (J. E. Smith) Dougl., Colorado.
Heliotropium xerophilum Cockerell, Texas.
Lappula occidentalis (S. Wats.) Greene, Colorado.
Pleuraphis Jamesii Torr., *New Mexico.*

308. **Dicaeoma hibisciatum.**
Althaea rosea L., Kansas.
Callirhoë involucrata (T. & G.) A. Gray, Colorado.
Gossypium hirsutum L., Arizona.
Napaea dioica L., *Illinois.*
Muhlenbergia racemosa (Michx.) B.S.P., Missouri.

Muhlenbergia repens (Presl) Hitchc., Arizona.
Muhlenbergia Schreberi Gmel., *Kentucky, Missouri, Oklahoma, South Carolina, Tennessee.*
Sporobolus airoides Torr., *South Dakota, Wyoming.*
Sporobolus asperifolius (Nees & Meyen) Thurber, *California, Wyoming.*

310. **Dicaeoma amphigenum.**
Calamovilfa longifolia (Hook.) Hack., Alberta.

311. **Dicaeoma holcinum.**
Notholcus lanatus (L.) Nash, Connecticut.

312. **Dicaeoma monoicum.**
Arabis Drummondii A. Gray, Alberta.
Arabis retrofracta Graham, *California*, Washington.
Smelowskia calycina (Desv.) C. Meyer, Colorado.
Koeleria cristata (L.) Pers., *California.*

313. **Dicaeoma Rhamni.**
Rhamnus alnifolia L'Hér., Indiana, *North Dakota*, Washington; Saskatchewan.
Rhamnus cathartica L., Connecticut; *Ontario*, Saskatchewan.
Elaeagnus commutata Bernh., Saskatchewan.
Lepargyraea argentea (Nutt.) Greene, Saskatchewan.
Lepargyraea canadensis (L.) Greene, Alaska; Saskatchewan.
Avena sativa L., Saskatchewan.
Beckmannia erucaeformis (L.) Host, Saskatchewan.
Bromus Pumpellianus Scribn., Alberta.
Calamagrostis canadensis (Michx.) Beauv., Connecticut; *British Columbia.*
Cinna latifolia (Trev.) Griseb., Idaho, Washington.
Deschampsia caespitosa (L.) Beauv., Alberta, Saskatchewan.
Festuca elatior L., *Kentucky*, Pennsylvania, *West Virginia.*
Lolium perenne L., Washington.
Notholcus lanatus (L.) Nash, Connecticut, *Massachusetts*, Tennessee.
Scolochloa festucacea (Willd.) Link, Saskatchewan.

315. **Dicaeoma Cynodontis.**
Capriola dactylon (L.) Kuntze, New Mexico.

316. **Dicaeoma Fraxini.**
Fraxinus americana L., Connecticut.
Fraxinus pennsylvanica Marsh., Connecticut, Florida, Mississippi.
Spartina alterniflora glabra (Muhl.) Fernald, North Carolina.
Spartina gracilis Trin., North Dakota.
Spartina Michauxiana Hitchc., Connecticut, *Minnesota, New Hampshire, New York.*

317. **Dicaeoma Distichlidis.**
Spartina pectinata Bosc, *Montana.*

318. **Dicaeoma Cephalanthi.**
Cephalanthus occidentalis L., Connecticut.
Spartina Michauxiana Hitchc., *New York.*

320. **Dicaeoma Jamesianum.**
Asclepias galioides H.B.K., Arizona, Colorado.

323. **Dicaeoma Windsoriae.**
Tridens flavus (L.) Hitchc., *Ohio.*

324. **Dicaeoma Eatoniae.**
Ranunculus abortivus L., Connecticut, Mississippi.

325. **Dicaeoma Koeleriae.**
Mahonia Aquifolium (Pursh) Nutt., South Dakota, Washington.
Koeleria cristata (L.) Pers., South Dakota.

326. **Dicaeoma Liatridis.**
Lacinaria punctata (Hook.) Kuntze, Wyoming.
Agrostis hyemalis (Walt.) B.S.P., Colorado.

327. **Dicaeoma epiphyllum.**
Catabrosa aquatica (L.) Beauv., Wyoming.
Deschampsia caespitosa Beauv., *California.*
Poa alpina L., Montana, Wyoming.
Poa compressa L., Pennsylvania, Washington.
Poa palustris L., Idaho, Montana.
Poa pratensis L., *Illinois,* Tennessee, *Wyoming;* Alberta, Manitoba.
Poa reflexa Vasey & Scribn., Idaho.

328. **Dicaeoma abundans.**
Symphoricarpos albus (L.) Blake, South Dakota.
Symphoricarpos oreophilus A. Gray, California, *Nevada.*
Festuca confinis Vasey, Nevada.

330. **Dicaeoma Pattersonianum.**
Agropyron spicatum (Pursh) Scribn. & Smith, Utah.
Sitanion jubatum J. G. Smith, California.

Dicaeoma montanense.
Agropyron caninum (L.) Beauv., Alberta.
Agropyron Smithii Rydb., Alberta.
Agropyron tenerum Vasey, Alberta.
Elymus canadensis L., Alberta.
Elymus virginicus L., West Virginia.

331. **Dicaeoma Asperifolii.**
Secale cereale L., Connecticut, North Dakota, Pennsylvania.

332. **Dicaeoma apocryptum.**
Hydrophyllum albifrons A. Heller, Washington.
Hydrophyllum Watsoni (A. Gray) Rydb., California.
Phacelia heterophylla Pursh, Wyoming.
Phacelia leucophylla Torr., *Wyoming.*
Agropyron tenerum Vasey, Utah.
Sitanion Hystrix (Nutt.) J. G. Smith, *California.*

333. **Dicaeoma Clematidis.**
Actaea rubra (Ait.) Willd., Minnesota.
Anemone cylindrica A. Gray, Alberta, Saskatchewan.
Aquilegia flavescens S. Wats., Utah, *Wyoming.*
Halerpestes Cymbalaria (Pursh) Greene, Alaska, Nevada; Alberta, Saskatchewan.
Thalictrum dioicum L., *South Dakota.*
Thalictrum sparsiflorum Turcz., California.
Agropyron caninum (L.) Beauv., *Colorado,* Utah.
Agropyron dasystachyum (Hook.) Scribn., Alberta.
Agropyron repens (L.) Beauv., Connecticut, *Illinois,* Pennsylvania.
Agropyron Smithii Rydb., Indiana; Alberta.
Agropyron tenerum Vasey, California; Alberta.
Bromus ciliatus L., Saskatchewan.
Bromus madritensis L., California.
Bromus marginatus Nees, Texas, Washington.

Bromus polyanthus Scribn., Wyoming.
Bromus Richardsonii Link, Montana, Utah.
Bromus tectorum L., California.
Elymus condensatus Presl, Idaho, Utah.
Elymus triticoides Buckl., Idaho.
Elymus vancouverensis Vasey, Washington.
Puccinellia Nuttalliana (Schultes) Hitchc., Alberta.
Sitanion Hystrix (Nutt.) J. G. Smith, Arizona.
Sitanion jubatum J. G. Smith, Utah.
Triticum aestivum L., Idaho, Mississippi, *Wyoming;* Saskatchewan; Coahuila, Guanajuato, Puebla.

337. **Dicaeoma Impatientis.**
Impatiens biflora Walt., Connecticut, Mississippi, Missouri, Washington.
Impatiens pallida Nutt., Minnesota, Tennessee.
Elymus canadensis L., Connecticut, Texas.
Elymus striatus Willd., *Tennessee.*
Elymus virginicus L., *Kentucky,* Texas, West Virginia.

338. **Dicaeoma glumarum.**
Agropyron cristatum Beauv., Washington.
Elymus glaucus Buckl., *Wyoming.*
Hordeum nodosum L., California, Washington.
Sitanion jubatum J. G. Smith, California.

339. **Dicaeoma anomalum.**
Hordeum vulgare L., Washington.

341. **Dicaeoma ignavum.**
Bambos vulgaris Schrad., Santo Domingo.
Dicaeoma obtectum.
Bidens frondosa L., Indiana.
Scirpus occidentalis (S. Wats.) Chase, Idaho.
Scirpus validus Vahl, California, *North Dakota.*

342. **Dicaeoma McClatchieanum.**
Scirpus microcarpus Presl, Idaho.

343. **Dicaeoma angustatum.**
Lycopus uniflorus Michx., Pennsylvania.
Scirpus cyperinus (L.) Kunth, Connecticut, *New Hampshire.*
Scirpus georgianus Harper, Connecticut.
Scirpus microcarpus Presl, California.

344. **Dicaeoma Eriophori.**
Senecio aureus L., Connecticut.
Eriophorum viridicarinatum (Engelm.) Fernald, Connecticut; British Columbia.
Dicaeoma canaliculatum.
Ambrosia trifida L., Connecticut.
Xanthium sp., Nebraska.
Cyperus esculentus L., Arizona, *Kentucky, Missouri, Ohio.*
Cyperus rotundus L., Mississippi, Oklahoma.
Cyperus strigosus L., Connecticut, Massachusetts, Missouri, *North Carolina, Ohio.*

345. **Dicaeoma Cyperi.**
Cyperus Schweinitzii Torr., *North Dakota.*
Cyperus strigosus L., West Virginia.
Kyllinga brevifolia Rottb., Costa Rica.
Kyllinga odorata Vahl, Martinique.

347. **Dicaeoma antioquiense.**
Cyperus diffusus Vahl, Honduras; Costa Rica.
Dicaeoma Eleocharidis.
Eupatorium maculatum L., Wyoming.
Eupatorium perfoliatum L., Connecticut, Massachusetts.
Eupatorium purpureum L., Connecticut, Massachusetts.
Eupatorium serotinum Michx., North Carolina.
Eleocharis obtusa (Willd.) Schultes, Connecticut, *Georgia, Mississippi, Missouri, New York, North Carolina.*
Eleocharis ovata (Roth) R. & S., North Carolina.

349. **Dicaeoma Scleriae.**
Scleria pterota Presl, St. Thomas.

350. **Dicaeoma Fimbristylidis.**
Fimbristylis diphylla (Retz.) Vahl, Panama.

351. **Dicaeoma Dichromenae.**
Dichromena radicans Cham. & Schlecht., Panama.
Dicaeoma angustatoides.
Rynchospora corniculata (Lam.) A. Gray, *Missouri.*
Rynchospora cyperoides (Sw.) Mart., Martinique.

352. **Dicaeoma consobrinum.**
Rynchospora corymbosa (L.) Britton, Porto Rico.

353. **Dicaeoma atrofuscum.**
Carex Douglasii Boott, Idaho.

354. **Dicaeoma Lysimachiae.**
Naumbergia thyrsiflora (L.) Duby, Manitoba.

355. **Dicaeoma Grossulariae.**
Grossularia Cynosbati (L.) Mill., Connecticut, Massachusetts.
Grossularia hirtella (Michx.) Spach, Idaho.
Grossularia inermis (Rydb.) Cov. & Britt., Montana.
Grossularia missouriensis (Nutt.) Cov. & Britt., *North Dakota.*
Grossularia setosa (Lindl.) Cov. & Britt., Alberta.
Ribes americanum Mill., Indiana, *North Dakota,* Wyoming.
Ribes bracteosum Dougl., Washington.
Ribes glandulosum Weber, Tennessee.
Ribes hudsonianum Richards., Wyoming.
Ribes lacustre (Pers.) Poir., Montana.
Ribes petiolare Dougl., Alaska, Washington.
Carex blanda Dewey, Oklahoma.
Carex castanea Wahl., *New York, Vermont.*
Carex crinita Lam., Connecticut, *New Hampshire.*
Carex gynandra Schw., *Massachusetts.*
Carex lanuginosa Michx., *North Dakota;* Alberta.
Carex nebraskensis Dewey, Utah, Washington.
Carex obnupta L. H. Bailey, *California.*
Carex sitchensis Prescott, Idaho, Washington.
Carex sparganioides Muhl., *Iowa.*
Carex stipata Muhl., *North Dakota.*
Carex tetanica Schkuhr, Ontario.
Carex trichocarpa Muhl., North Dakota.

358. **Dicaeoma Urticae.**
Urtica holosericea Nutt., California.
Urtica Lyallii S. Wats., Washington.
Carex amplifolia Boott, Idaho.
Carex Emoryi Dewey, Texas.
Carex nebraskensis Dewey, *California*, Idaho, Washington.
Carex obnupta L. H. Bailey, California.
Carex stricta Lam., *Iowa.*

360. **Dicaeoma minutissimum.**
Decodon verticillatus (L.) Ell., Connecticut.
Dicaeoma Dracunculi.
Artemisia biennis Willd., Alberta.
Artemisia camporum Rydb., Alberta.
Artemisia frigida Willd., Alberta.
Carex filifolia Nutt., *Colorado.*
Carex Geyeri Boott, California, Montana.
Carex heliophila Mackenzie, Wyoming.
Carex obtusata Lilj., Montana, *South Dakota.*
Carex praegracilis W. Boott, *California*, *Montana*, New Mexico.
Carex Rossii Boott, Washington, Wyoming.

362. **Dicaeoma Asterum.**
Aster frondeus (A. Gray) Greene, *Wyoming.*
Aster puniceus L., Washington.
Aster sp., Arkansas, Maine.
Erigeron philadelphicus L., Mississippi.
Erigeron pulchellus Michx., Arkansas.
Solidago canadensis L., Connecticut, Pennsylvania; *Ontario.*
Solidago juncea Ait., Connecticut, Indiana.
Solidago rigida L., South Dakota.
Solidago rugosa Mill., Connecticut.
Solidago sempervirens L., Connecticut.
Solidago serotina Ait., *Wyoming.*
Carex aenea Fernald, Montana.
Carex angustior Mackenzie, Idaho.
Carex athrostachya Olney, California.
Carex cephalantha (L. H. Bailey) Bickn., *New York.*
Carex diandra Schrank, New York.
Carex festivella Mackenzie, Idaho, Montana.
Carex muskingumensis Schw., Indiana.
Carex normalis Mackenzie, Nebraska.
Carex Rossii Boott, Montana.
Carex sparganioides Muhl., *North Dakota.*
Carex stipata Muhl., Colorado, Idaho.
Carex subfusca W. Boott, California.
Carex vulpinoidea Michx., Connecticut.
Dulichium arundinaceum (L.) Britton, Connecticut, *New Hampshire.*

365. **Dicaeoma Peckii.**
Kneiffia perennis (L.) Pennell, Wisconsin.
Meriolix serrulata (Nutt.) Walp., Wyoming.
Oenothera biennis L., Colorado, Mississippi, *South Dakota.*
Carex Muhlenbergii Schkuhr, Connecticut, West Virginia.

366. **Dicaeoma hieraciatum.**
Crepis runcinata (James) T. & G., North Dakota.

Lactuca sativa L., Manitoba.
Carex praegracilis W. Boott, Nevada.
Carex sp., *North Dakota, Oregon, Wyoming.*

368. **Dicaeoma Sambuci.**
Sambucus canadensis L., Mississippi.
Carex lupuliformis Sartwell, Indiana.
Carex lurida Wahl., *Arkansas*, Connecticut, Georgia.

369. **Dicaeoma Trientalis.**
Carex sp., *Missouri.*

370. **Dicaeoma obscurum.**
Juncoides comosum (E. Meyer) Sheldon, California, Washington.

371. **Dicaeoma Veratri.**
Epilobium alpinum L., Wyoming.
Epilobium anagallidifolium Lam., Alaska.
Epilobium sp., *Colorado.*

372. **Dicaeoma atropunctum.**
Anticlea chlorantha (Richards.) Rydb., Ontario.

374. **Dicaeoma Porri.**
Allium Schoenoprasum L., Washington.

375. **Dicaeoma granulisporum.**
Allium cernuum Roth, *South Dakota.*

376. **Dicaeoma Asparagi.**
Allium Cepa L., Wisconsin.
Asparagus officinalis L., Arizona, *Illinois*, Mississippi, Pennsylvania, Washington, *Wyoming.*

377. **Dicaeoma Smilacis.**
Smilax Bona-nox L., Indiana.
Smilax glauca Walt., *Missouri, West Virginia.*
Smilax havanensis Jacq., Florida.
Smilax rotundifolia L., New York.
Smilax sp., Pennsylvania.

Dicaeoma Aletridis.
Aletris farinosa L., Indiana, Wisconsin.

379. **Dicaeoma Iridis.**
Iris missouriensis Nutt., New Mexico.
Iris versicolor L., *New Hampshire.*

380. **Dicaeoma Cannae.**
Canna coccinea Ait., Honduras.

381. **Dicaeoma Polygoni-amphibii.**
Geranium maculatum L., Mississippi.
Bilderdykia Convolvulus (L.) Dumort., Connecticut, *Kentucky, North Dakota,* Tennessee.
Bilderdykia scandens (L.) Greene, Mississippi.
Persicaria coccinea (Muhl.) Greene, Alberta.
Persicaria Hartwrightii (A. Gray) Greene, Indiana.
Persicaria hydropiperoides (Michx.) Small, *Kentucky, Missouri.*
Persicaria incarnata (Ell.) Small, *Missouri.*
Persicaria lapathifolia (L.) S. F. Gray, *California, Ohio.*

Persicaria Muhlenbergii (Meissn.) Small, *Missouri.*
Persicaria pennsylvanica (L.) Small, North Carolina.
Persicaria Persicaria (L.) Small, Delaware, Georgia, Mississippi.
Persicaria punctata (Ell.) Small, Mississippi, *Oklahoma*, Tennessee.
Persicaria setacea (Baldw.) Small, *Alabama.*
Tovara virginiana (L.) Raf., Indiana.

382. **Dicaeoma Polygoni-vivipari.**
Bistorta bistortoides (Pursh) Small, Utah.

385. **Dicaeoma Polygoni-alpini.**
Aconogonum phytolaccaefolium (Meissn.) Small, *California.*
Dicaeoma Acetosae.
Rumex hastatulus Baldw., Alabama.

386. **Dicaeoma Guillemineae.**
Brayulinea densa (Willd.) Small, Arizona.

388. **Dicaeoma Rivinae.**
Rivina humilis L., Texas.

389. **Dicaeoma tardissimum.**
Arenaria Fendleri A. Gray, *Colorado.*
Dicaeoma Calthae.
Caltha palustris L., *North Dakota.*

390. **Dicaeoma areolatum.**
Caltha biflora DC., Alaska.

391. **Dicaeoma Oxalidis.**
Ionoxalis Martiniana (Zucc.) Small, Florida.

392. **Dicaeoma Nolitangeris.**
Impatiens biflora Walt., Georgia, *Massachusetts.*
Dicaeoma Violae.
Viola blanda Willd., Connecticut, Pennsylvania.
Viola canadensis L., British Columbia.
Viola eriocarpa Schw., Arkansas, Mississippi, Pennsylvania.
Viola fimbriatula J. E. Smith, Connecticut.
Viola incognita Forbesii Brainerd, Pennsylvania.
Viola nephrophylla Greene, Alberta.
Viola papilionacea Pursh, North Carolina.
Viola primulifolia L., Pennsylvania.
Viola septentrionalis Greene, *New York.*

394. **Dicaeoma Epilobii-tetragoni.**
Boisduvalia densiflora (Lindl.) S. Wats., Washington.
Epilobium minutum Lindl., California.
Gayophytum racemosum T. & G., *Wyoming.*
Gayophytum ramosissimum T. & G., Washington.
Oenothera strigosa (Rydb.) Mackenzie & Bush, Washington.
Sphaerostigma alyssoides (H. & A.) Walp., California.

396. **Dicaeoma Proserpinacae.**
Proserpinaca palustris L., Connecticut, Indiana.
Dicaeoma Pimpinellae.
Osmorrhiza Claytoni (Michx.) Clarke, Massachusetts.
Osmorrhiza divaricata Nutt., Idaho.
Osmorrhiza intermedia (Rydb.) Blankinship, Alaska, *Montana, Utah, Wyoming.*
Osmorrhiza longistylis (Torr.) DC., Indiana, *North Dakota*, Pennsylvania.
Osmorrhiza nuda Torr., Idaho.

398. **Dicaeoma Cicutae.**
Cicuta maculata L., Maine.
Cicuta occidentalis Greene, Colorado, Utah.
Dicaeoma marylandicum.
Sanicula marylandica L., Colorado, Pennsylvania; Manitoba.

401. **Dicaeoma Convolvuli.**
Convolvulus arvensis L., Indiana.
Convolvulus sepium L., Connecticut, Mississippi, Pennsylvania.

402. **Dicaeoma Lithospermi.**
Evolvulus nummularius L., Salvador.

403. **Dicaeoma Cressae.**
Cressa depressa Goodding, California.

404. **Dicaeoma fumosum.**
Loeselia ciliata L., Salvador.
Loeselia glandulosa G. Don, Salvador.

405. **Dicaeoma Menthae.**
Clinopodium vulgare L., *Massachusetts.*
Hedeoma pulegioides (L.) Pers., Indiana.
Koellia flexuosa (Walt.) MacM., Connecticut, Indiana.
Koellia incana (L.) Kuntze, Connecticut.
Koellia virginiana (L.) MacM., Mississippi.
Mentha spicata L., California, Connecticut, Indiana.
Monarda didyma L., Indiana, *Massachusetts.*
Monarda fistulosa L., Connecticut, Mississippi; Manitoba.
Monarda mollis L., Alberta.
Monarda stricta Wooton, *Wyoming.*

407. **Dicaeoma Leonotidis.**
Leonotis nepetaefolia (L.) R. Br., St. Thomas; St. Croix.

408. **Dicaeoma Hyptidis.**
Hyptis capitata (L.) Jacq., Santo Domingo; St. Thomas.
Hyptis radiata Willd., Cuba.
Dicaeoma medellinense.
Hyptis polystachya H.B.K., Salvador.
Hyptis suaveolens (L.) Poir., Nicaragua.

415. **Dicaeoma Ruelliae.**
Blechum Brownei (Sw.) Juss., Salvador; St. Croix.
Justicia sp., Panama.
Ruellia ciliosa Pursh, *Kentucky.*
Ruellia strepens L., Mississippi.

417. **Dicaeoma punctatum.**
Galium concinnum T. & G., Mississippi.
Galium triflorum Michx., North Dakota.

418. **Dicaeoma troglodytes.**
Galium triflorum Michx., Wisconsin.

419. **Dicaeoma splendens.**
Hymenoclea Salsola T. & G., Sonora.

423. **Dicaeoma evadens.**
Baccharis halimifolia L., Florida, Virginia.

425. **Dicaeoma exornatum.**
Baccharis rhexioides H.B.K., Salvador.

427. **Dicaeoma Caleae.**
Calea zacatechichi Schlecht., Salvador.
Calea sp., Honduras.
Dicaeoma Helianthi-mollis.
Helianthus angustifolius L., *Mississippi, North Carolina.*
Helianthus annuus L., Arizona, Connecticut, Mississippi, Tennessee; Manitoba.
Helianthus debilis Nutt., *Florida.*
Helianthus divaricatus L., *Arkansas,* Connecticut, *Illinois, Missouri.*
Helianthus giganteus L., Connecticut.
Helianthus lenticularis Dougl., Arizona.
Helianthus microcephalus T. & G., *Georgia.*
Helianthus mollis Lam., *Missouri.*
Helianthus Nuttallii T. & G., *Wyoming.*
Helianthus scaberrimus Ell., Indiana, *Wisconsin.*
Helianthus strumosus L., Arkansas, *South Carolina.*
Helianthus subrhomboideus Rydb., *South Dakota.*
Helianthus tuberosus L., Delaware, Georgia.

432. **Dicaeoma Verbesinae.**
Verbesina occidentalis (L.) Walt., Kentucky.

435. **Dicaeoma Cnici.**
Cirsium lanceolatum (L.) Hill, Connecticut, Mississippi.
Dicaeoma Lapsanae.
Lapsana communis L., Washington.

436. **Dicaeoma Harknessii.**
Ptiloria pauciflora (Torr.) Raf., Wyoming.
Ptiloria tenuifolia (Torr.) Raf., California, Wyoming.

437. **Dicaeoma Orbicula.**
Nabalus racemosus (Michx.) DC., North Dakota.
Nabalus trifoliolatus Cass., Pennsylvania.

438. **Dicaeoma hemisphaericum.**
Lactuca pulchella (Pursh) DC., *California;* Alberta.

443. **Pucciniola Rickeriana.**
Rumex paucifolius Nutt., Utah.

447. **Pucciniola Argophyllae.**
Psoralidium floribundum (Nutt.) Rydb., Nebraska, South Dakota, Wyoming.
Psoralidium tenuiflorum (Pursh) Rydb., *Oklahoma, South Dakota.*
Pucciniola oblonga.
Trifolium procumbens L., Washington.

448. **Pucciniola nerviphila.**
Trifolium repens L., Montana, Washington.

450. **Pucciniola Hedysari-obscuri.**
Hedysarum americanum (Michx.) Britton, Alaska, South Dakota; Manitoba.
Hedysarum pabulare A Nelson, *Wyoming.*
Hedysarum sulphurescens Rydb., Wyoming.

452. **Pucciniola maculans.**
Cestrum nocturnum L., Salvador.

455. **Allodus Calochorti.**
Calochortus Nuttallii T. & G., *Wyoming.*

457. **Allodus gigantispora.**
Anemone cylindrica A. Gray, Alberta.

458. **Allodus Podophylli.**
Podophyllum peltatum L., Connecticut.

461. **Allodus Jussiaeae.**
Ludwigia alternifolia L., Maryland.
Ludwigia polycarpa Short & Peter, Wisconsin.

463. **Allodus Jonesii.**
Cogswellia foeniculacea (Nutt.) Coult. & Rose, Wyoming.
Leptotaenia multifida Nutt., Wyoming.
Musineon Hookeri (T. & G.) Nutt., Wyoming.

465. **Allodus Swertiae.**
Swertia scopulina Greene, Wyoming.

466. **Allodus crassipes.**
Ipomoea tiliacea (Willd.) Choisy, Costa Rica.
Ipomoea trifida (H.B.K.) G. Don, *Texas.*
Allodus megalospora.
Ipomoea murucoides R. & S., Guerrero.

467. **Allodus nocticolor.**
Ipomoea fistulosa Mart., Salvador.
Ipomoea intrapilosa Rose, *Oaxaca.*

468. **Allodus Giliae.**
Leptodactylon Nuttallii (A. Gray) Rydb., California.
Microsteris humilis Greene, *Nevada.*
Microsteris micrantha (Kellogg) Greene, *California.*
Phlox multiflora A. Nelson, Wyoming.
Phlox pilosa L., Iowa.
Phlox speciosa Pursh, California.

469. **Allodus Douglasii.**
Phlox depressa (E. Nelson) Rydb., *Colorado.*
Phlox Hoodii Richards., Saskatchewan.

472. **Allodus complicata.**
Penstemon procerus Dougl., *California.*

474. **Allodus tenuis.**
Eupatorium urticaefolium Reichenb., Connecticut, *Massachusetts.*

477. **Allodus subcircinata.**
Senecio integerrimus Nutt., *North Dakota.*

478. **Klebahnia Glycyrrhizae.**
Glycyrrhiza lepidota Nutt., Alberta.

479. **Klebahnia gemmata.**
Jacquemontia nodiflora (Desv.) G. Don, Santo Domingo.

481. **Klebahnia Montanoae.**
Montanoa hibiscifolia Benth., Costa Rica.
Klebahnia Bidentis.
Bidens squarrosa H.B.K., Salvador.

486. **Bullaria inflata.**
Stigmaphyllon lingulatum (Poir.) Small, Santo Domingo.

487. **Bullaria Gouaniae.**
Gouania polygama (Jacq.) Urban, Salvador; Santo Domingo.
Gouania sp., Honduras.

488. **Bullaria invaginata.**
Gouania polygama (Jacq.) Urban, Santo Domingo; St. Thomas; St. Croix.

491. **Bullaria Cynomarathri.**
Cynomarathrum Nuttallii (A. Gray) Coult. & Rose, Wyoming.

492. **Bullaria Vincae.**
Vinca major L., Ontario.

493. **Bullaria impedita.**
Salvia hyptoides Mart. & Gal., Salvador.
Salvia occidentalis Sw., Salvador; St. Thomas.

494. **Bullaria globosipes.**
Lycium halimifolium Mill., Ohio.

495. **Bullaria tumidipes.**
Lycium halimifolium Mill., *South Dakota.*

496. **Bullaria Arthuriana.**
Vernonia canescens H.B.K., Salvador.

497. **Bullaria Vernoniae.**
Vernonia Baldwinii Torr., Texas.

498. **Bullaria inaequata.**
Vernonia patens H.B.K., Salvador.

499. **Bullaria idonea.**
Eremosis trifloscula (H.B.K.) Gleason, Salvador.
Bullaria praealta.
Eremosis trifloscula (H.B.K.) Gleason, Salvador.

500. **Bullaria Conoclinii.**
Ageratum conyzoides L., North Carolina.
Ageratum sp., Georgia.
Conoclinium coelestinum (L.) DC., *Louisiana.*
Eupatorium collinum DC., Morelos.

503. **Bullaria Kuhniae.**
Kuhnia eupatorioides L., Alabama.

508. **Bullaria Absinthii.**
Artemisia dracunculoides Pursh, Wyoming.

509. **Bullaria Cirsii.**
Cirsium acaulescens (A. Gray) K. Schumann, *Wyoming.*
Cirsium Flodmannii (Rydb.) Arth., *Montana.*
Cirsium foliosum (Hook.) DC., Wyoming.
Cirsium palousense Piper, Washington.
Cirsium undulatum (Nutt.) Spreng., Washington, *Wyoming.*

511. **Bullaria suaveolens.**
Cirsium arvense (L.) Scop., Ohio, Washington.
Bullaria Cyani.
Centaurea Cyanus L., Connecticut, Indiana, Michigan, Washington.

512. **Bullaria Bardanae.**
Arctium minus Schlecht., Connecticut, *Kentucky*, Maine, *Ohio.*

513. **Bullaria Hieracii.**
Agoseris aurantiaca (Hook.) Greene, *Wyoming.*
Hieracium albiflorum Hook., Wyoming.
Hieracium canadense Michx., *South Dakota.*
Hieracium columbianum Rydb., *Wyoming.*
Hieracium gracile Hook., Wyoming.
Leontodon Taraxacum L., Connecticut, Massachusetts, New Hampshire, Rhode Island, Vermont.
Sitilias caroliniana (Walt.) Raf., Georgia.

516. **Teleutospora jamaicensis.**
Bauhinia Pauletia Pers., Salvador.

519. **Teleutospora Rudbeckiae.**
Rudbeckia laciniata L., Maryland; Manitoba.

525. **Micropuccinia asarina.**
Asarum caudatum Lindl., British Columbia.

526. **Micropuccinia Arenariae.**
Moehringia lateriflora (L.) Fenzl, Alaska.

528. **Micropuccinia Anemones-virginianae.**
Anemone cylindrica A. Gray, Connecticut.

531. **Micropuccinia Drabae.**
Draba incerta Payson, Wyoming.

532. **Micropuccinia Holboellii.**
Arabis Holboellii Hornem., Alaska.

533. **Micropuccinia Cruciferarum.**
Cardamine cordifolia A. Gray, Utah.

Micropuccinia aberrans.
Smelowskia americana Rydb., Washington.

535. **Micropuccinia pallido-maculata.**
Micranthes arguta (D. Don) Small, Washington, Wyoming.

Micropuccinia Heucherae.
Mitella diphylla L., Connecticut.
Tiarella cordifolia L., Connecticut, New Hampshire.

536. **Micropuccinia curtipes.**
Micranthes virginiensis (Michx.) Small, Connecticut.
Saxifraga rivularis L., Wyoming.

538. **Micropuccinia Ribis.**
Ribes triste Pall., Washington.

539. **Micropuccinia Parkerae.**
Ribes lacustre (Pers.) Poir., Alaska.

541. **Micropuccinia Arechavaletae.**
Cardiospermum Halicacabum L., Salvador; Porto Rico.
Cardiospermum microcarpum H.B.K., Santo Domingo.
Serjania racemosa Schum., Salvador.

542. **Micropuccinia Malvacearum.**
Malvastrum corchorifolium (Desv.) Britton, Santo Domingo.
Malvastrum coromandelianum (L.) Garcke, Santo Domingo.

543. **Micropuccinia Sherardiana.**
Sphaeralcea coccinea (Nutt.) Rydb., Utah.

544. **Micropuccinia heterospora.**
Abutilon indicum (L.) Sweet, Porto Rico.
Malvaviscus arboreus Cav., Honduras; Salvador.
Sida cordifolia L., Porto Rico.
Sida spinosa L., Santo Domingo.
Sida urens L., Santo Domingo.
Wissadula amplissima (L.) R. E. Fries, Porto Rico.

545. **Micropuccinia lobata.**
Althaea rosea (L.) Cav., Arizona.

548. **Micropuccinia Circaeae.**
Circaea alpina L., Washington.

549. **Micropuccinia gigantea.**
Chamaenerion spicatum (Lam.) S. F. Gray, Washington; Manitoba.

552. **Micropuccinia Ligustici.**
Ligusticum filicinum S. Wats., *Wyoming.*

556. **Micropuccinia Dichondrae.**
Dichondra carolinensis Michx., Texas.

558. **Micropuccinia Urbaniana.**
Valerianodes jamaicensis (L.) Kuntze, Santo Domingo; St. Croix.

559. **Micropuccinia Lantanae.**
Lantana Camara L., St. Croix.
Lantana trifolia L., Costa Rica.
Priva lappulacea (L.) Pers., Santo Domingo.

562. **Micropuccinia Physalidis.**
Physalis heterophylla Nees, Ontario.

564. **Micropuccinia Clintonii.**
Elephantella groenlandica (Retz.) Rydb., Washington.
Pedicularis racemosa Dougl., Wyoming.

568. **Micropuccinia lateritia.**
Borreria laevis (Lam.) Griseb., Costa Rica.
Spermacoce glabra Michx., *Illinois.*
Spermacoce tenuior (L.) Lam., Salvador.

570. **Micropuccinia Symphoricarpi.**
Symphoricarpos albus (L.) Blake, Alaska.
Micropuccinia Adoxae.
Adoxa moschatellina L., Wyoming.

571. **Micropuccinia Xanthii.**
Ambrosia trifida L., *North Dakota.*
Xanthium chinense Mill., *Ohio, Texas.*
Xanthium inflexum Mackenzie & Bush, Oklahoma.
Xanthium italicum Mor., *Missouri.*
Xanthium pennsylvanicum Wallr., *Illinois, Louisiana.*

575. **Micropuccinia Asteris.**
Aster azureus Lindl., Iowa.
Aster multiflorus Ait., *North Dakota.*
Aster salicifolius Lam., *Kentucky, Ohio.*

576. **Micropuccinia Grindeliae.**
Chrysothamnus lanceolatus Nutt., Wyoming.
Isocoma vernonioides Nutt., *California.*

581. **Micropuccinia Melampodii.**
Synedrella nodiflora (L.) Gaertn., St. Croix; Costa Rica; Salvador.
Tridax procumbens L., Panama.

582. **Micropuccinia Millefolii.**
Achillea Millefolium L., Washington, *Wyoming.*

584. **Micropuccinia Emiliae.**
Calendula officinalis L., Kansas, Missouri, Texas.
Micropuccinia recedens.
Senecio aureus L., Connecticut.

585. **Micropuccinia Fraseri.**
Hieracium scabrum Michx., Nebraska, *New York.*

591. **Puccinia Heliconiae.**
Bihai borinquena Griggs, Santo Domingo.

594. **Puccinia Antirrhini.**
Antirrhinum majus L., *Kansas*, Washington, Wyoming.

597. **Puccinia turgidipes.**
Viguiera deltoidea Parishii (Greene) Vasey & Rose, California.

599. **Puccinia Noccae.**
Nocca rigida Cav., Salvador.
Puccinia Parthenii.
Parthenium Hysterophorus L., Nuevo Leon.

608. **Uredo rubescens.**
Dorstenia Contrajerva L., Costa Rica.

609. **Uredo Coccolobae.**
Coccolobis Uvifera (L.) Jacq., Santo Domingo.
Uredo Cyathulae.
Cyathula achyranthoides (H.B.K.) Moq., Costa Rica.

614. **Uredo Cupheae.**
Parsonsia Parsonsia (L.) Britton, Santo Domingo.

615. **Uredo Sapotae.**
Sapota Achras Mill., Santo Domingo.

617. **Uredo Hameliae.**
Hamelia erecta Jacq., Santo Domingo.

618. **Uredo Garcilassae.**
Garcilassa rivularis Poepp. & Endl., Costa Rica.

634. **Aecidium Tournefortiae.**
Tournefortia hirsutissima L., Santo Domingo.

VOLUME 7 PART 7

NORTH AMERICAN FLORA

(UREDINALES)

AECIDIACEAE (continuatio)

JOSEPH CHARLES ARTHUR

BULLARIA

JOSEPH CHARLES ARTHUR AND EDWIN BUTTERWORTH MAINS

TELEUTOSPORA

JOSEPH CHARLES ARTHUR AND GUY RICHARD BISBY

MICROPUCCINIA (pars)

JOSEPH CHARLES ARTHUR AND HERBERT SPENCER JACKSON

MYCOLOGICAL BUREAU MYCOLOGY

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THE NEW YORK BOTANICAL GARDEN

DECEMBER 11, 1922

ANNOUNCEMENT

NORTH AMERICAN FLORA is designed to present in one work descriptions of all plants growing, independent of cultivation, in North America, here taken to include Greenland, Central America, the Republic of Panama, and the West Indies, except Trinidad, Tobago, and Curaçao and other islands off the north coast of Venezuela, whose flora is essentially South American.

The work will be published in parts at irregular intervals, by the New York Botanical Garden, through the aid of the income of the David Lydig Fund bequeathed by Charles P. Daly.

It is planned to issue parts as rapidly as they can be prepared, the extent of the work making it possible to commence publication at any number of points. The completed work will form a series of volumes with the following sequence:

Volume 1. Myxomycetes, Schizophyta.

Volumes 2 to 10. Fungi.

Volumes 11 to 13. Algae.

Volumes 14 and 15. Bryophyta.

Volume 16. Pteridophyta and Gymnospermae.

Volumes 17 to 19. Monocotyledones.

Volumes 20 to 34. Dicotyledones.

The preparation of the work has been referred by the Scientific Directors of the Garden to a committee consisting of Dr. N. L. Britton, Dr. W. A. Murrill, and Dr. J. H. Barnhart.

Professor John M. Coulter, of the University of Chicago; Mr. Frederick V. Coville, of the United States Department of Agriculture; and Professor William Trelease, of the University of Illinois, have consented to act as an advisory committee.

Each author will be wholly responsible for his own contributions, being restricted only by the general style adopted for the work, which must vary somewhat in the treatment of diverse groups.

The subscription price is fixed at $1.50 for each part; it is expected that four or five parts will be required for each volume. A limited number of separate parts will be sold at $2.00 each. Address:

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22^{1}: 1–80. Rosales: Podostemonaceae, Crassulaceae, Penthoraceae, Parnassiaceae. **22**^{2}: 81–192. Saxifragaceae, Hydrangeaceae, Cunoniaceae, Iteaceae, Pterostemonaceae, Hamamelidaceae, Altingiaceae, Phyllonomaceae. **22**^{3}: 193–292. Grossulariaceae, Platanaceae, Crossosomataceae, Connaraceae, Calycanthaceae, Rosaceae (pars). **22**^{4}: 293–388. Rosaceae (pars). **22**^{5}: 389–480. Rosaceae (pars). **22**^{6}: 481–560. Rosaceae (pars).

24^{1}: 1–64. (Rosales:) Fabaceae (pars). **24**^{2}: 65–136. Fabaceae (pars).

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29^{1}: 1–102. Ericales: Clethraceae, Monotropaceae, Lennoaceae, Pyrolaceae, Ericaceae.

32^{1}: 1–86. Rubiales: Rubiaceae (pars). **32**^{2}: 87–158. Rubiaceae (pars).

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34^{1}: 1–80. (Carduales:) Carduaceae (pars). **34**^{2}: 81–180. Carduaceae (pars). **34**^{3}: 181–288. Carduaceae (pars).

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VOLUME 7 PART 8

NORTH AMERICAN FLORA

(UREDINALES)

AECIDIACEAE (continuatio)

JOSEPH CHARLES ARTHUR

MICROPUCCINIA (conclusio)

JOSEPH CHARLES ARTHUR AND HERBERT SPENCER JACKSON

PUBLISHED BY

THE NEW YORK BOTANICAL GARDEN

DECEMBER 20, 1922

ANNOUNCEMENT

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6^1: 1–84. Phyllostictales: Phyllostictaceae (pars).

7^1: 1–82. Ustilaginales: Ustilaginaceae, Tilletiaceae. **7^2**: 83–160. Uredinales: Coleosporiaceae, Uredinaceae, Aecidiaceae (pars). **7^3**: 161–268. Aecidiaceae (pars). **7^4**: 269–336. Aecidiaceae (pars). **7^5**: 337–404. Aecidiaceae (pars). **7^6**: 405–480. Aecidiaceae (pars). **7^7**: 481–540. Aecidiaceae (pars).

10^1: 1–76. (Agaricales:) Agaricaceae (pars). **10^2**: 77–144. Agaricaceae (pars). **10^3**: 145–226. Agaricaceae (pars).

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605-

VOLUME 7 PART 9

NORTH AMERICAN FLORA

(UREDINALES)

AECIDIACEAE (conclusio)

JOSEPH CHARLES ARTHUR

ADDITIONS AND CORRECTIONS TO UREDINALES

PUBLISHED BY

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ANNOUNCEMENT

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24[1]: 1–64. **24**[2]: 65–136. **24**[3]: 137–200. **24**[4]: 201–250. (Rosales:) Fabaceae (pars).

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29[1]: 1–102. Ericales: Clethraceae, Monotropaceae, Lennoaceae, Pyrolaceae, Ericaceae.

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VOLUME 7 PART 10

NORTH AMERICAN FLORA

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ADDITIONS AND CORRECTIONS (continued)

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ANNOUNCEMENT

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VOLUME 7 PART 11

NORTH AMERICAN FLORA

(UREDINALES)

ADDITIONS AND CORRECTIONS (continued)

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VOLUME 7 PART 12

NORTH AMERICAN FLORA

(UREDINALES)

ADDITIONS AND CORRECTIONS (concluded)

MYCOLOGY
IMPERIAL BUREAU
14 NOV 1927

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ANNOUNCEMENT

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3^{1}: 1–88. Hypocreales: Nectriaceae, Hypocreaceae. Fimetariales: Chaetomiaceae, Fimetariaceae.

6^{1}: 1–84. Phyllostictales: Phyllostictaceae (pars).

7^{1}: 1–82. Ustilaginales: Ustilaginaceae, Tilletiaceae. **7**^{2}: 83–160. **7**^{3}: 161–268. **7**^{4}: 269–336. **7**^{5}: 337–404. **7**^{6}: 405–480. **7**^{7}: 481–540. **7**^{8}: 541–604. **7**^{9}: 605–668. **7**^{10}: 669–732. **7**^{11}: 733–796. Uredinales: Coleosporiaceae, Uredinaceae, Aecidiaceae.

10^{1}: 1–76. **10**^{2}: 77–144. **10**^{3}: 145–226. **10**^{4}: 227–276. (Agaricales:) Agaricaceae (pars).

14^{1}: 1–66. Sphaerocarpales: Sphaerocarpaceae, Riellaceae. Marchantiales: Ricciaceae, Corsiniaceae, Targioniaceae, Sauteriaceae, Rebouliaceae, Marchantiaceae.

15^{1}: 1–75. Sphagnales: Sphagnaceae. Andreaeales: Andreaeaceae. Bryales: Archidiaceae, Bruchiaceae, Ditrichaceae, Bryoxyphiaceae, Seligeriaceae. **15**^{3}: 77–166. Dicranaceae, Leucobryaceae.

16^{1}: 1–88. Ophioglossales: Ophioglossaceae. Marattiales: Marattiaceae. Filicales: Osmundaceae, Ceratopteridaceae, Schizaeaceae, Gleicheniaceae, Cyatheaceae (pars).

17^{1}: 1–98. Pandanales: Typhaceae, Sparganiaceae. Naiadales: Zannichelliaceae, Zosteraceae, Cymodoceaceae, Naiadaceae, Lilaeaceae. Alismales: Scheuchzeriaceae, Alismaceae, Butomaceae. Hydrocharitales: Elodeaceae, Hydrocharitaceae. Poales: Poaceae (pars). **17**^{2}: 99–196. **17**^{3}: 197–288. Poaceae (pars).

21^{1}: 1–93. Chenopodiales: Chenopodiaceae. **21**^{2}: 95–169. Amaranthaceae. **21**^{3}: 171–254. Allioniaceae.

22^{1}: 1–80. Rosales: Podostemonaceae, Crassulaceae, Penthoraceae, Parnassiaceae. **22**^{2}: 81–191. Saxifragaceae, Hydrangeaceae, Cunoniaceae, Iteaceae, Pterostemonaceae, Hamamelidaceae, Altingiaceae, Phyllonomaceae. **22**^{3}: 193–292. Grossulariaceae, Platanaceae, Crossosomataceae, Connaraceae, Calycanthaceae, Rosaceae (pars). **22**^{4}: 293–388. **22**^{5}: 389–480. **22**^{6}: 481–560. Rosaceae (pars).

24^{1}: 1–64. **24**^{2}: 65–136. **24**^{3}: 137–200. **24**^{4}: 201–250. (Rosales:) Fabaceae (pars).

25^{1}: 1–87. Geraniales: Geraniaceae, Oxalidaceae, Erythroxylaceae, Linaceae. **25**^{2}: 89–171. Tropaeolaceae, Balsaminaceae, Limnanthaceae, Koeberliniaceae, Zygophyllaceae, Malpighiaceae. **25**^{3}: 173–261. Rutaceae, Surianaceae, Simaroubaceae, Burseraceae. **25**^{4}: 263–326. Meliaceae, Trigoniaceae. Polygalales: Vochyaceae, Polygalaceae (pars). **25**^{5}: 327–383. Polygalaceae (pars), Dichapetalaceae.

29^{1}: 1–102. Ericales: Clethraceae, Monotropaceae, Lennoaceae, Pyrolaceae, Ericaceae.

32^{1}: 1–86. **32**^{2}: 87–158. Rubiales: Rubiaceae (pars).

33^{1}: 1–110. Carduales: Ambrosiaceae, Carduaceae (pars).

34^{1}: 1–80. **34**^{2}: 81–180. **34**^{3}: 181–288. **34**^{4}: 289–360. (Carduales): Carduaceae (pars).